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The Royal Commission
on
Metropolitan Toronto

Physical Services, Environmental Protection and Energy Supply in Metropolitan Toronto

Background Report

THE ROYAL COMMISSION ON METROPOLITAN TORONTO

PHYSICAL SERVICES, ENVIRONMENTAL PROTECTION AND ENERGY SUPPLY IN METROPOLITAN TORONTO

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PREFACE

This study is one in a series of background reports prepared for The Royal Commission on Metropolitan Toronto, and designed to provide the public with an appreciation of Metropolitan Toronto and its government, prior to and during the public hearings. A full listing of the background studies appears on the inside back cover of this document.

Any opinions or views expressed herein are those of the consultants and are not necessarily shared by the Commission.

PHYSICAL SERVICES, ENVIRONMENTAL PROTECTION AND ENERGY SUPPLY IN METROPOLITAN TORONTO

Within the general scope of the Commission's terms of reference, this report contains a background analysis of the state of servicing in Metropolitan Toronto of water supply, sewerage and sewage works, storm water management, solid waste management and energy supply together with observations on the environmental control of air quality and noise.

ACKNOWLEDGEMENTS

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Metropolitan Solicitor's Office
City Works Department
North York Works Department
East York Works Department
York Works Department
Scarborough Works Department
Etobicoke Works Department
Ontario Ministry of the Environment
Toronto Hydro Electric System
East York Hydro Electric Commission
Etobicoke Hydro Electric Commission
North York Hydro Electric System
Scarborough Public Utilities Commission
Consumers Gas Company
Oil Heating Association of Canada
Gulf Oil Company

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SUMMARY

This overview study and report inventories those institutions, services and programs which constitute the support systems upon which the quality of life in Metropolitan Toronto and dependent areas is based. The inventory is conducted in respect to the direct servicing aspects of water supply and distribution, sewerage and sewage treatment, storm water management and drainage, solid waste collection, treatment and disposal and energy supply and distribution from both electric power sources and direct fossil fuel supplies. Environmental factors such as air quality control and sound control are also studied.

The basic information for the studies was obtained from background reports, structured interviews with responsible officials in the inventoried areas supplemented by the directly related experience of the study team.

From this information a series of observations could be drawn relating to each of the support systems and to the environmental factors investigated. The observations covered applicable legislation and regulations affecting its operation, current management practices and development programs and related utility rates and charges and/or fiscal constraints where applicable.

From these observations a summary of technological adequacy for now and the future has been prepared, together with indications of management system suitability and the rate or cost base of the service or control system discussed. From all of that certain issues in the form of questions are raised for public debate and Commission consideration.

The current status of the individual support systems reviewed in this project may be summarized as follows:

Water Supply

The system for providing and distributing treated water within the Metropolitan area is generally in first class condition and adequate to meet present demands. The overall quality of service ranks with the best in the world.

In the event of a prolonged drought period the capacity of the system could become overtaxed but this situation will be relieved by the construction of additional treatment capacity which is currently in the final planning stages.

There are no areas of significant contention between the area municipalities and Metro at the management and operations level. Certain policy decisions are pending between Metro and The Regional Municipality of York relating to the supply of water to the region from the Metro facilities. Within Metro there are differences in rates being charged at the retail level among the area municipalities. There are also differences in the allocation of and use of revenues derived from water sales.

Sewerage

This system which collects and treats waterborne sewage from domestic, commercial, institutional and industrial sources is also well developed. Standards of service are high and there are no significant operational or management problems at the present time.

Financing of capital works in the system has been by debentures while operations and maintenance have been financed from current revenues. Exceptions to this general policy have been the subdivision and redevelopment charges imposed respectively by the newer and older municipalities. A number of the area municipalities are currently studying the use of a sewage service charge imposed on the water bill. Such a charge would be used to defray a portion of the costs of operation and maintenance of sewerage facilities and would have the effect of distributing a portion of such costs on a

user basis. The Metropolitan Corporation already adds a surcharge for this purpose when billing area municipalities for water supplied.

Two of the main issues in the policy area are:

- whether development outside Metro will require construction of new trunk sewers through Metro and an enlargement of treatment facilities
- whether there will be a requirement for some form of tertiary treatment which would necessitate large new expenditures on treatment works.

Stormwater Management

Local storm water drainage is the responsibility of the area municipalities. As initial development and subsequently redevelopment has occurred there have been problems with flooding caused by the higher surface run-off resulting from such development. There are continuing programs to upgrade the standard of these facilities and the number of flooding complaints have tended to diminish.

While Metro has considerable powers under the Metropolitan Toronto Act with respect to drainage, these have not been exercised directly. With the formation of the Metropolitan Toronto and Region Conservation Authority a new agency was available to coordinate water management in the major rivers and streams flowing through Metro. In practice, therefore, the MTRCA administers work on these major watercourses and charges the Authority's share of works done to Metro in cases where those works are considered to be solely for the benefit of Metro.

There are, however, certain areas where the absence of a clearly defined planning requirement continues to cause problems. At the area municipality level, intensive development or redevelopment in the upper reaches of a watercourse can produce much higher storm water runoff in downstream sections than was previously envisaged. This can lead to damage and loss of amenities which were previously constructed in those downstream areas.

The same problem occurs in a broader sense as development takes place in the upper reaches of the rivers and streams which flow through Metro. Such development causes higher flows to be experienced in the downstream

section of these watercourses with consequent impact on the rate of erosion, the frequency of flooding and the deterioration of the quality of the river waters.

Solid Wastes

The system of collection in the area municipalities is generally satisfactory. Residential refuse in general is being collected by municipal forces, industrial refuse by private collectors, while commercial refuse tends to be collected partly by municipal and partly by private collectors. There are no serious problems in collection, though some municipalities are currently incurring higher collection costs than others pending the construction of suitably placed transfer stations as the terminal dumping point within their area.

There is a continuous need for land on which to dispose of the wastes. This applies irrespectively of whether the wastes are conveyed directly to the landfill site following collection or whether they are first processed to separate recyclable materials or incinerated. In the latter cases there always remains a residue for disposal.

Metro has become increasingly concerned by its apparent inability to secure firm commitments for future landfill sites. Similar difficulties have been encountered within Metro in connection with applications for rezoning for construction of incinerators and/or transfer stations. Disposal of liquid wastes remains a contentious issue and a continual operating problem for liquid waste collectors. As a result of these frustrations Metro officials would like to see the Province take a more significant role in the disposal of solid and liquid wastes.

Energy - 1: Electrical

Electrical service within Metropolitan Toronto is provided by municipal electric utilities in each of the six area municipalities. The Hydro Electric Commission of Ontario furnishes the bulk power and has

extensive authority in the regulation and control of the municipal utilities. Good liaison is maintained between the utilities and the corresponding municipal councils. The Metropolitan Corporation per se has no direct responsibilities in this area.

The quality of service provided by the municipal electric utilities is high. Ability to maintain the existing reliability level will depend on the ability of Ontario Hydro to continue expansion of its primary generating and transmission facilities at the rate needed to keep pace with increasing demand.

A recurring issue is that of amalgamation of the six electric utilities under one regional authority. The most immediate benefits of such a step would be the introduction of a uniform system of rates for electrical service; a centralized administration and standard design and operating practices. Benefits from a technical standardization would not accrue immediately as it would not be economic to replace equipment and facilities prior to the expiry of their useful life. It is appropriate to point out the peculiar responsibilities of Scarborough Public Utilities Commission in respect to water supply and distribution in that Borough and of the Toronto Hydro Electric System in regard to district heating. Both provide excellent levels of service in these areas and any integration of electrical utility responsibility at the Metropolitan level would have to take these factors into consideration.

Energy - 2: Fossil Fuels

Of all the fuel consumed in Metropolitan Toronto for heating buildings and for industrial process heating, roughly half is natural gas and half is petroleum. The balance of the heating energy, about two percent is supplied by coal and electricity. Petroleum supplies practically all of the energy required for transportation, except for subways, streetcars, and trolley buses which are powered by electric motors.

Supply and distribution of fossil fuels is undertaken by private industry and is organized independently of political boundaries. Natural Gas is distributed throughout Metro by Consumers Gas Company which operates under the Ontario Energy Board Act. The Board regulates earnings, sets rates and enforces safety provisions.

Petroleum products used for transportation fuel and for heating are obtained from seven major producers and marketted through several hundred retail outlets. Government legislation and policies relating to fossil fuels are national and provincial rather than municipal.

Practically all of the coal consumed in Metro is American bituminous. Coal provides only a very minor portion of fossil fuel energy. In spite of the rising costs of other fossil fuels coal remains a more expensive fuel for general use than either oil or gas.

While neither Metro nor the individual area municipalities are directly involved in the supply and distribution of fossil fuels they are affected by the air pollution resulting from their use. In the central core area of Metro this matter is a serious concern and the maintenance of satisfactory air quality may require some form of regulation and control of fossil fuel use within the area. The requirement for coordination and control could also arise from the need to conserve and to optimize the use of these non-renewable resources.

Air Management

Air quality monitoring and pollution control are administered by the Ontario Ministry of the Environment for all of the province. Consequently, neither Metro nor the area municipalities have any direct authority in this field.

The day to day air management is generally satisfactory. The Ministry makes effective use of its powers to require curtailment of emissions at major facilities when the air quality deteriorates below a certain level. The main weakness in air management relates to the lack of formal control or approval on the location of new facilities. Current land use zoning is based on planning concepts which did not explicitly take into account air quality. As a consequence new developments have been approved for locations downstream of major emitting facilities. Without the new development in place the original facility could be operating within regulations. When a new facility is constructed in close proximity to the original source of emissions, there may be insufficient opportunity for adequate diffusion and dilution of the polluting materials with the result that the original facility may then find itself in contravention of regulations.

A similar situation can arise with respect to Metro and outside municipalities, where a major source such as a large thermal power station or industry can have a significant effect on the air quality within Metro. A discharge of this type can cause a general decrease in air quality within Metro such that normal operation of facilities within the municipal boundaries can permit the air total pollution load to exceed prescribed limits.

A third area of concern is the fact that a large proportion of the air pollution within Metro is produced by mobile sources, the major ones being automotive vehicles and airplanes. Pollution control criteria on these two sources are a matter of federal jurisdiction and consequently outside Metro's control.

Noise

Up to a few years ago, the creation of noise was controlled by local municipalities under the general nuisance by-laws. The increasing attention to the public health and social aspects of noise has led to a more sophisticated approach including the development of measuring techniques and the establishment of criteria for noise levels in specifically defined situations. The provincial Ministry of the Environment has recently produced a model by-law which is currently under review by municipalities throughout Ontario. The Province is suggesting that this by-law or modification thereof be accepted by the municipalities and administered by them. To date the only municipality in the Province to have its own by-law and staff to administer it is the City of Toronto.

As was the case with air, there are also a number of similar jurisdictional problems with regard to noise. Many of the major noise sources in Metro are outside the control of Metro or its area municipalities. The provincial Ministry of Transportation and Communications has jurisdiction over provincial highways; the federal Ministry of Transportation has jurisdiction over CN and CP railways and also of airports and aircraft. The Federal Government also prescribes limits on noise levels for new vehicles. As a result, several of the major noise sources are outside the jurisdiction of local municipalities and there is no mechanism which formally permits a direct approach from a municipality

to the Federal Government in respect of federal non-compliance with local regulations.

1. INTRODUCTION

This study and report is prepared to develop background information and reveal current conditions of operation in respect of servicing and environmental aspects upon which the quality of life in Metropolitan Toronto and dependent areas is based.

It therefore provides but a part of the total input to the scope of the Commission's undertaking in examining and evaluating the structure, organization and operation of local government within the Metropolitan Toronto area including all governments, boards, commissions and public utilities.

It is appropriate that, in developing this background with regard to servicing the public's requirements for daily living within Metropolitan Toronto and for maintaining the environment quality of the air and water resources around them, the information be developed not only to disclose the need for change but also to provide a support base upon which the impact of other actions can be tested for effect.

This background has also been developed with the primary recognition that the original concept in 1954 was that Metropolitan Toronto had a primary role to provide adequate and safe water supply for each of the area municipalities to ensure the public health and safety and to permit sound economic growth. It had been further charged to institute adequate pollution control of the adjacent and contiguous water resources so as to protect the public health and to maintain and restore ecological systems and environmental aesthetics. Similar responsibilities in drainage were implied and in 1967 the problem of refuse or residual disposal was recognized as a public health threat first and an environmental concern second and the Metropolitan Corporation was given additional specific power to deal with its treatment and disposal.

Now, therefore, it is important that these functions and their current state be reviewed in relation to the original intent to determine compliance and adequacy and that they be analysed to determine capability for the future in technical, social and economic terms.

Energy is a further area which is assuming an ever increasing importance for the citizens of the Metropolitan area. It gives rise to many complex issues: the retail cost of the different forms of energy; the pollutional effects of its use, both in regard to air quality and sound levels; the requirement to increase supply to meet future needs; and a concurrent requirement to conserve non-renewable fuel resources. These issues require analysis to determine whether a local or regional government presence would improve co-ordination, public benefit, economic saving and environmental protection.

2. PURPOSE AND SCOPE

This study was initiated to provide information to assist The Royal Commission on Metropolitan Toronto in fully comprehending the aspect of public utility servicing and related environmental conditions within the Metropolitan Toronto area.

By the preparation of an inventory based on existing data, interviews and related experiences of the major service support systems of water supply, sewage works, drainage, solid waste, management and energy, the current level of service to the public can be described in respect to technical, economic and social adequacy. Related concerns in regard to air quality and sound environment can be established and tested with respect to not only the present but the future and for the impact of change.

From such analyses, constraints may be disclosed or issues become obvious so that the public can determine their preferences and desires and the Commission determine ultimately the need for and desirability of change.

3. METHODOLOGY

1. General

The initial task for the seven systems studied involved the collection and review of existing reports and governing legislation. The information so obtained was then supplemented and updated through discussions with officials of provincial and federal regulatory agencies and with interviews with officials from responsible departments of Metropolitan Toronto, the six area municipalities and from the energy industries.

2. Interviews

Each official interviewed had been contacted in advance by the Commission and the level of co-operation and response obtained was excellent.

The objective of the interviews was to review for each support system:

- physical state of the system and its capacity to meet the public demand, together with a forecast for its growth over the next ten years

- management of the system; in particular any constraints to effective management and development which could be reduced or removed by modification of existing legal or political structures

- adequacy of rate structures to provide sufficient funds to assure the financial well-being of the system.

Within the area municipalities the Works Department has authority for water distribution, sewerage collection, local drainage and solid wastes collection. (Scarborough is an exception where water distribution is under the Public Utilities Commission.) In addition, the Works Department is generally the first point of contact for complaints on air and noise pollution within the municipality. As a result of this wide involvement, the respective Commissioner of Works and/or his assistants were able to furnish information covering each municipality's activities in most of the areas of the study at a single interview.

For the municipal aspects of energy, interviews were held with the managers of each of the five municipal hydro electric commissions and of the electricity department of the Borough of York.

On the Metro level the Commissioner of Works and his staff were interviewed with respect to water supply, sewage treatment and solid wastes disposal. Metro has no comprehensive control over storm water comparable to its mandate on water, sewerage and solid wastes. There clearly is an important interface area between storm water management at the municipal level and the condition of the major rivers and streams within Metro and this aspect was discussed in interviews with officials of the Metropolitan Toronto and Region Conservation Authority.

With respect to air pollution, while the municipalities may experience pollution resulting from activities within their own or an adjacent municipality they have no direct responsibility for its measurement and control. Consequently, in order to gather information on how both area municipalities and Metro are affected by current air management programmes, extensive interviews were held with officials of the provincial Ministry of the Environment and officials of the Federal Environmental Protection Service.

A somewhat similar situation applied to noise where apart from the City of Toronto, most municipalities have not been greatly involved in problems

of noise. It is the Province's intention that noise be handled on a local municipal basis, but at the present time most of the information on noise was gained from interviews with officials from the Ministry of the Environment, from Environment Canada, and from the City of Toronto.

Metro has, at present, no responsibility in energy matters other than those relating to the facilities it owns. The hydro electric commissions of each area municipality furnished information on electrical energy use in their respective municipalities while Ontario Hydro furnished corresponding information on its role in the bulk supply of electrical energy. The supply and distribution of fossil fuels is carried out by the private sector and interviews were held with officials of Consumers Gas Company, Oil Heating Association of Canada and the Gulf Oil Company.

3. System Reports

As far as practicable, the same format was adopted in preparing the individual reports on the systems. This comprised the following sections:

(i) General: - including a physical description of the system and its capacity

(ii) Legislation: - noting the more significant items of legislation relating to the system under review

(iii) Management: - dealing with system management and the relationships and interaction between area municipalities, Metro and Provincial and Federal Governments where appropriate

(iv) Rates: - including comments on the overall financial aspects of the systems

(v) A concluding section stating the more prominent issues which were apparent from the study.

This format was appropriate for the established service oriented systems; i.e., water, sewerage, drainage, solid wastes and electrical energy. It required modification for air and noise management where the monitoring and control functions are still being developed.

4. OBSERVATIONS

SECTION A - WATER SUPPLY AND TREATMENT

1. General

In 1954 following the formation of Metropolitan Toronto, the Corporation assumed ownership and operation of all water treatment plants, pumping stations, and reservoirs within its limits and a network of trunk mains sufficient to undertake its obligations under Part IV of the Municipality of Metropolitan Toronto Act.

These actions permitted the Corporation to provide a safe and adequate water supply and to transmit this supply from the production and treatment works to storage and to each of the area municipalities. Each of the latter was to receive it in bulk and distribute it to individual customers.

Using the original City of Toronto water supply system as the spine of its new responsibility, the Metropolitan Works Department commenced to expand and develop the Metropolitan supply system on a comprehensive and planned basis so that by 1975, the Metropolitan Corporation now owns and operates one of the most sophisticated urban waterworks in the world.

As indicated in Figure 1, included at the end of this report, the source of supply is Lake Ontario and currently three major water treatment plants, the Westerly Filtration Plant, the Island Filtration Plant and the R.C. Harris Filtration Plant provide chemical treatment, flocculation, sedimentation, filtration and superchlorination to the Lake waters which are then pumped into the Metropolitan trunk main system. Currently this system has a combined capacity to furnish 470 million gallons daily (within 24 hours) into the system.

A fourth major filtration plant is now under construction at the easterly end of the Corporation's waterfront which will increase source capacity by an additional 150 million gallons daily when completed.

Potable water is distributed throughout the Metropolitan Corporation through a major network of large sized trunk watermains. Because of the steep rise of land from the lakefront to the north, some six water pressure districts have had to be created to maintain service pressures within the range of 40 to 100 pounds per square inch.

To effect this separation into pressure districts, the Metropolitan Corporation must maintain and operate a series of repumping stations and reservoirs as shown on Figure 1. Storage capacity equivalent to the maximum day's water demand is available at system pressure within most districts and because of topography, storage for the higher districts has had to be created in area municipalities of the Regional Municipality of York.

The standards of the physical system of waterworks maintained by Metro are such as to provide reliability of service while at the same time taking advantage of new technology to improve efficiency and reduce costs. Treatment plant and pumping station design provide for a surety of service under extreme emergency conditions but the equipment and process system employed are of modern and even forward design.

Similarly, reservoir and main design and construction provide for reasonable safety factors in capacity while employing long life and low maintenance standards.

2. Legislation

(a) The Municipality of Metropolitan Act

The Municipality of Metropolitan Toronto Act being Chapter 295 of the Revised Statutes of Ontario 1970, defines the responsibilities of the Metropolitan Corporation, as distinct

from those of the City and the Boroughs, in the matter of water supply, treatment and distribution. Metropolitan Toronto on behalf of the City and Boroughs is responsible for all water production, treatment and storage works and all trunk distribution mains connected therewith. Distribution on a local basis within the City or each Borough from the points of supply provided by Metropolitan Toronto is the responsibility of the area municipality.

A similar split responsibility in water supply has been established in other Regional Municipalities, e.g. Regional Municipality of Niagara and Regional Municipality of York, while in Regional Municipalities established more recently, e.g. Hamilton-Wentworth, Durham, Peel and Halton, the whole of water supply and distribution has been assigned to the Regional Municipality.

Under Part III of The Municipality of Metropolitan Toronto Act it is important to recognize that the Metropolitan Corporation controls the standard of water works service throughout the whole area and approves of all extensions to the system whether carried out by an area municipality in relation to its local system or not. Additionally, the Metropolitan Corporation has the authority to supply water outside its limits for any period up to twenty years; (an example of this is the agreement being negotiated between the Metropolitan Corporation and the Regional Municipality of York).

(b) Other Legislation Affecting Water Supply & Treatment

(i) Public Utilities Act

This Act defines the responsibilities and rights of an agency commissioned or authorized to own and/or operate a public water supply system. Its provisions relate more strongly to the operation of local distribution systems as owned by the area municipalities rather than the Metropolitan Corporation's system.

(ii) The Municipal Act

The Municipal Act defines the manner in which a municipality shall or may carry out its assigned responsibilities and accordingly various sections of the Act relate to the establishment and operation of the water supply, treatment and distribution systems. The specific clauses refer primarily to procedures and actions necessary to setting rates and raising monies for capital financing.

(iii) Ontario Water Resources Act

Any Municipality contemplating the establishment of a water works system, must under this Act, obtain the approval of the Minister of the Environment before proceeding with any such works.

(iv) Environmental Protection Act

The purpose of this Act is to provide for the protection and conservation of the natural environment. Accordingly, the establishment and/or operation of a water supply system must comply with the requirements of this Act especially with regard to ensuring that a waterworks system is maintained and operated so as to meet the conditions of original approval and the conditions of water quality set under regulations of the Act.

(v) Public Health Act

Under the Public Health Act, the Medical Officer of Health has the authority to check the water quality of a potable supply and distribution system and in the event of contamination being present, to take such action as deemed necessary to protect the public.

(vi) Other Legislation

- International Joint Commission Act regulates the use of Great Lakes Waters;

- Labour Relations Act covers working conditions and facilities for the accommodation of operations and maintenance staff;

- Industrial Safety Act relates to safety standards in operations and maintenance.

The foregoing outline of legislation affecting the establishment, operation and maintenance of water supply and treatment works covers those Acts having a significant impact on the water works industry. Various other federal and provincial laws, too extensive to be itemized in this report, relate to the establishment, operation and maintenance of municipal utilities such as water works. Recommended standards as published by such organizations as the American Water Works Association are used extensively as guidelines for the proper operation of a water supply system.

Of some frustration to the area municipalities are the delays involved in obtaining approvals by Metro and subsequently the Ontario Municipal Board for each project of an ongoing capital works programme which is to be financed by debentures. The effect of delay is to concentrate the annual programmes into the latter half of the year. Some form of prior authorization would permit the work to be scheduled over a longer period and so result in more effective use of resources.

3. Management

(a) System Capability

The Metropolitan Toronto Water Works System as distinct from the distribution systems of the City and Boroughs is considered to be approximately 80 per cent complete in relation to ultimate development. The book value of the system including intakes, treatment plants, pumping and storage facilities, and trunk distribution mains is in the order of $450,000,000. Based on a report prepared in 1970 on Water Supply in Metropolitan Toronto, the total spending for new or replacement works for the period 1975-1980 will be in the order of $75,000,000 to $100,000,000.

Since 1954, system reliability has been increased markedly. Watermain breaks and system failures have almost been eliminated. Treatment capacity must be increased immediately to keep pace with an increasing rate of demand and a prolonged hot, dry weather spell could seriously tax overall system capability by reducing available supply from storage facilities. Should water quality of Lake Ontario be allowed to deteriorate further, some further levels of chemical treatment may become necessary.

The program for replacement of facilities suffering from structural or other deterioration is less well defined than planning for expansion of the basic system. To a degree, this aspect of the water works program has been carried out on a need basis resulting from a failure or due to increased demands resulting from redevelopment. This situation is most pronounced in the core area of the City of Toronto where many watermains were constructed 80 to 100 years ago and where substantial redevelopment is occurring placing substantial increases in demand on the system. In 1967, the City implemented a concerted program of reinforcement and refurbishing of its system to enable it to meet the peak demands of the high density development of today and probable in the future.

The division of responsibility between Metropolitan Toronto and the area municipalities has no apparent affect on the overall efficiency of water supply. Cooperation between the responsible parties is excellent and the City and Boroughs readily accept standards established by Metropolitan Toronto Works Department.

Within the City and each of the Boroughs, satisfaction with the adequacy of the Metropolitan Toronto Water Works System was expressed. With regard to the secondary distribution systems operated by the Boroughs of York and East York and the City, facilities are considered complete except for replacement of aged components or for capacity increases necessitated by redevelopment. Expansion of the local systems is still being experienced in Etobicoke, North York and Scarborough, as new development takes place. In the latter three Boroughs, the developer constructs distribution facilities within the development while the Borough provides sub-trunk facilities to accomplish transmission from the Metro works to the local distribution network. Basically, such works are provided on a need basis but are planned from the Metropolitan Toronto Report on Water Supply.*

In confirmation of the adequacy of both the Metropolitan Toronto and local water works systems, no restrictions on water use such as lawn watering, have been necessary in recent years. Minor deficiencies in pressures have generally been alleviated by local adjustments to pressure district boundaries. Plans of all proposed new works are submitted to Metro for approval at the time Ministry of Environment approval is solicited. In the Boroughs of York and East York, like the City, a program for the replacement of deteriorating facilities has been undertaken. The Borough of York budgets approximately $200,000 annually for the replacement program. East York did not indicate a typical annual budget for such purposes. The City's annual budget for reinforcement and refurbishing of the distribution network and for leak correction, meter replacement, etc., is approximately $1,500,000.

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*James F. MacLaren Ltd., Reports on Water Supply for Metropolitan Toronto, 1957, and 1970, prepared for The Municipality of Metropolitan Toronto

Budgets for new water works in Scarborough and North York amount to approximately $1,000,000 per annum in each Borough. Etobicoke was unable to indicate a typical annual budget. Development in Etobicoke and North York is more nearly complete while Scarborough will continue to experience new growth in the north-east sector particularly for some time to come. Substantial expansion of the Metropolitan Toronto Water Works is planned for the Scarborough area including the proposed new Easterly Filtration Plant at East Point Park and the associated trunk mains, pumping stations and reservoirs necessary to effect proper distribution from the new source of supply.

The initiation of new projects for water supply and treatment by Metropolitan Toronto is generally in accordance with the Report on Water Supply. The Metro Works Department's practice has been to update this report at regular intervals to reflect changes in anticipated growth or redevelopment patterns. The Boroughs in turn have initiated new works in accordance with need as dictated by new subdivision approvals or local redevelopment activities but relating any such projects to the Metro master plan.

(b) Supply Beyond Metropolitan Boundaries

In the development of the Metropolitan Toronto Water Works System since 1954, nominal provision has been made for the possible future supply of water to surrounding municipalities. In order to locate topography suitable for the development of ground level storage facilities for the northerly service areas of Metropolitan Toronto, it has been necessary to extend certain trunk mains into Markham and Vaughan to suitable reservoir sites. This necessity renders supply to the southern areas of Regional Municipality of York most convenient.

As of this date (March 1975), negotiations are being finalized on agreements for the supply of water from Metropolitan Toronto to the Regional Municipality of York and parts of the Regional Municipality of

Durham (North Pickering Community Project and Pickering Airport), with the Ministry of the Environment constructing the works necessary as a provincial project. The extension of the project to service the balance of the Towns of Pickering and Ajax is still being considered by the Region of Durham.

Extension of water supply from Metropolitan Toronto to the west into the Regional Municipality of Peel is highly unlikely as a result of the development by the Ministry of the Environment of the South Peel Water Supply Project based on an independent source of supply at the Lake Ontario shoreline.

Supply of water to municipalities beyond the Metropolitan boundary is a prerogative of the Metropolitan Council under the Municipality of Metropolitan Toronto Act. In discussions with representatives of the Boroughs, the decision by Metro to proceed with supply to Regional York and Durham is not anticipated to detract from the service available to the Boroughs but might, if anything, benefit the Boroughs as a result of a somewhat more extensive Metro system through the Boroughs to accommodate the surrounding municipalities.

4. Water Rate Structures

Under the Municipality of Metropolitan Toronto Act, it is necessary that the Metropolitan Council so fix the rates at which water is supplied the area municipalities that the revenues of the water works system will be sufficient to make the system self sustaining after providing for maintenance, renewals, depreciation, debt charges, and reserves. Surpluses, however, may not be employed for any purpose but water works. Currently, one rate is established for the City and all Boroughs, i.e. 25¢ per 1,000 gallons. To this is added a 10 per cent surcharge for purposes of supporting a portion of the operation of the Metropolitan Sewage Works System.

It is anticipated that a rate increase will be necessary in the near future. Approximately 49 per cent of the water rate, exclusive of the surcharge, is for operation and maintenance and 51 per cent is for interest on debt and debt retirement. Except on the occasional small capital improvement (less than $500,000) all works are debentured. This year, 1975, the Metropolitan Corporation is considering a total capital and operating budget of $29,950,000 for all Metropolitan water works purposes. Recently, the Province of Ontario, through the Ministry of the Environment, has introduced a 15 per cent subsidy on water works projects as carried out by Metropolitan Toronto. The agreement for the sale of water to the Ministry of the Environment on behalf of the Regional Municipality of York establishes the water rate at 40¢ per 1,000 gallons and provides for adjustment in accordance with any rate adjustment to the Boroughs.

In the City and in the Boroughs of East York, York, North York and Scarborough, with minor exceptions, new works are financed out of current revenues on a cash basis. Etobicoke finances most major new works through the sale of debentures. In those Boroughs (Scarborough, Etobicoke, and North York) continuing to experience new development such as subdivisions, the developer is responsible for the provision of water distribution facilities within the development.

Most water services in the City are not metered and service charges are on a flat rate basis. The metered services represent only 8 per cent of the total number of services, however, the metered services account for 62 per cent of the City's water consumption. Metered water rates are set at 45.1¢ per 1,000 gallons plus a quarterly charge for meter rental. Flat rates are complicated and depend on such matters as floor space, number of rooms and number and type of fixtures.

In each of the Boroughs almost all water services are metered. The water rates applied vary slightly. For typical domestic consumers the initial rate varies from a low of 54.7¢ per

1,000 gallons in Scarborough to a high of approximately 66¢ per 1,000 gallons in Etobicoke. York and Etobicoke allow a somewhat lower initial rate to industrial consumers and all Boroughs except York allow reduced rates for consumption in excess of stipulated quantities on a monthly or quarterly basis. Typical rates for large industrial consumers are as low as 35¢ per 1,000 gallons in Etobicoke and 36¢ per 1,000 gallons in East York.

None of the Boroughs apply a surcharge to their water rates for sewage service purposes. However, the City sometime ago applied a surcharge of 18 per cent to the water rate as a "sewage service rate" which virtually fully supports the cost of operating and regularly maintaining its sewerage system.

Wholesale water rates set by Metro and consumer rates set by the area municipalities can be considered on a par with or slightly less than those applied in most urban areas of North America.

5. Summary

Since the introduction of the metropolitan form of government in 1954, the level of water works system reliability has been increased markedly. Development of the Metropolitan system is considered to be approximately 80 per cent complete in relation to the anticipated ultimate system. Works to be provided in the foreseeable future include additional treatment facilities and extension of the trunk distribution network particularly in the north-eastern section of Metropolitan Toronto. Extension of service to surrounding municipalities in York and Durham Regions can be readily accommodated. Other works remaining to be constructed include water mains to replace deteriorating pipes in the older parts of the network and parallel facilities to meet increased demands in areas experiencing extensive redevelopment at higher densities.

The Boroughs of Etobicoke, North York and Scarborough continue to require extensions of their distribution networks to accommodate new development

while the Boroughs of York, East York and the City of Toronto require only limited expansion for purposes of new development but require significant refurbishing and replacement of older facilities.

Distribution facilities have been developed on a planned basis keeping pace with growth in demand: however, production facilities, as a metropolitan responsibility, are lagging somewhat pending completion of new treatment works over the next four years.

A healthy spirit of cooperation exists between the responsible departments of Metropolitan Toronto, the City and the Boroughs. The split responsibility resulting from the two-tier system of government is not considered to detract from the ability to manage and operate water supply and treatment facilities in an efficient manner at either level.

Water rate structures have been developed at each level of government to provide self-sustaining water works systems.

Several situations give cause for question in the future development of the Region:

1. Despite the fact that the Metropolitan Corporation sets an equal and self-sustaining rate for water among all area municipalities, there is a significant variation in consumer rates set by the area municipalities. This variation reflects such factors as the age of the respective local systems, retirement of debt, the mix of industrial, commercial and residential consumers and political considerations relating to the extent that revenues generated from the water rates are used for other than waterworks purposes.

2. Rezoning of land for water works purposes cannot be initiated by the Metropolitan Corporation but requires that an area municipality take action on its behalf. This procedure can restrict the Metropolitan Corporation's ability to maintain its development program.

3. Both the Metropolitan Corporation and the area municipalities must justify each capital improvement to be debenture financed to the Ontario Municipal Board. Such procedure has proven costly and time consuming. Approval of an annual spending program would improve the implementation efficiency.

SECTION B - SEWERAGE AND SEWAGE TREATMENT

1. General

The Metropolitan Corporation assumes under its Act responsibility for providing trunk sewers and sewage treatment, while the area municipalities provide local services and customer servicing.

Since its formation, Metropolitan Toronto has rapidly expanded its trunk sewer system to meet the ever increasing flows and to reduce sewer overflows from those (combined) sewers which carry a combination of sanitary sewage and storm runoff. In older, well established communities, this type of sewer system is not uncommon, with all roof drainage, weeping tile, road drainage, etc. discharging into one common sewer with the sanitary wastes. Later practice in the sanitary field developed the separated sewer system, where the sanitary sewers carry their wastes to the treatment plants while the storm sewers discharge directly into the rivers or the lake. Most new developments in the Toronto area are being built on the separated sewer system.

In parallel with the expansion of its trunk sewer system, the Metropolitan Corporation has expanded its treatment capability on a vigorous basis. It has built a complete new treatment plant at the mouth of the Humber River to serve the west end of Metropolitan Toronto, and has now consolidated its treatment facilities in the following four plants:

Main Treatment Plant	- average capacity	180 MGD*
Humber Treatment Plant	- average capacity	70 MGD
Highland Creek Treatment Plant	- average capacity	16 MGD
North Toronto Treatment Plant	- average capacity	10 MGD

* M.G.D. Million gallons per day (Gallon refers to the imperial gallon throughout the report)

A total average treatment capacity of 276 million gallons per day is currently available with a capability to treat peak flows of up to 410 million gallons per day without exceeding the minimum effluent standards, as defined by the Province. An extensive programme is still underway to bring the daily capacity to 364 million gallons with a peak flow treatment capability of 550 million gallons daily. Figure 2, at the end of this report, shows schematically the metropolitan sewerage system.

The area municipalities in the meantime have embarked on their individual programmes to serve their entire built-up area as well as to separate their single sewer systems. These programmes are currently well underway.

It has been the policy of Metropolitan Toronto and its area municipalities to accept as much industrial waste into the sanitary system as practically can be treated at the municipal plants. However, the quality and allowable strength is regulated and the industries are assessed those additional treatment costs caused by their individual waste products.

2. Legislation

The following legislation and acts cover the most significant aspects of sewerage and sewage treatment in the Metropolitan Toronto area:

Municipal

- The Municipality of Metropolitan Toronto Act
- The Municipality of Metropolitan Toronto Bylaw No. 2520
- The Municipal Act

Discharge Control and Level of Treatment

- International Joint Commission Regulations
- The Environmental Protection Act
- The Ontario Water Resources Act
- The Public Health Act

Management (Operations, Maintenance, Safety, etc.)

- The Labour Relations Act
- The Industrial Safety Act

The applicable highlights of the foregoing acts are summarized as follows:

The Municipality of Metropolitan Toronto Act

This Act establishes the respective duties and responsibilities of the Metropolitan Corporation and of the City and the five Boroughs. For sewerage and sewage treatment, it states in general terms that the Metropolitan Corporation will be responsible for the trunk collection sewers and all treatment works, while the City and Boroughs are responsible for the individual portion of the house connections which are located within the street line, and also for the local sewers to their point of discharge into the metropolitan trunk collectors.

This Act also provides for the financing of sewage works through one or a combination of:

- debentures, chargeable against all taxable properties; this operation provides for the bulk of the sewerage and sewage treatment costs

- a sewer service charge on the water bill to cover all or any part of operational costs

The Act further stipulates that the Metropolitan Corporation may pay up to 25% of the costs to the area municipalities of any program to separate an existing combined sewer system into two distinct sewer systems; one for sanitary sewage and one for storm drainage.

All municipal sewage works are subject to prior approval by the Metropolitan Corporation.

The Municipality of Metropolitan Toronto
ByLaw No. 2520

- "to regulate the discharge of sewage and land drainage in the Metropolitan Area"

This bylaw prohibits the discharge of specific matter or waste water into sanitary sewers, combined sewers, storm sewers and/or watercourses and details acceptable discharge standards. It further empowers the Commissioner of Works to direct industries to provide treatment of their wastes prior to the discharge into the sewerage system. Alternatively, the Metropolitan Corporation may enter into an agreement to accept such industrial wastes upon payment to compensate for any additional costs of treatment.

The Municipal Act

This Act details in part how municipalities may impose sewer rates to finance in whole, or part of, capital financing as well as operational costs for sewerage and sewage treatment works.

International Joint Commission
(A combined Canadian - U.S. body)

The International Joint Commission regulates the use of the Great Lake Waters. It defines the level of sewage and waste treatment required prior to discharge into the Great Lakes and specifies unacceptable contaminants. The enforcing of these regulations is delegated to those Provinces and States (U.S.) bordering the Great Lake waters.

The Environmental Protection Act

"The purpose of this Act is to provide for the protection and conservation of the natural environment" (Act 2).

Specifically this Act prohibits the discharge of contaminants in excess of the prescribed amounts and/or concentrations. Under the power of this Act, the Province of Ontario establishes the allowable discharge from all sewage treatment works.

The Ontario Water Resources Act

The construction, installation, alteration or extension of sewerage and sewage treatment works is subject to prior approval by the Ministry of the Environment under this Act as well as under the Environmental Protection Act.

The Public Health Act

The Ministry of Health has, under this Act, the authority to direct a municipality to establish, improve, enlarge or renew sewerage or sewage treatment works if, in the opinion of the Medical Officer of Health, it is in the interest of the public health to do so.

The Labour Relations Act

This Act covers working conditions and facilities for the accommodation of operations and maintenance staff.

The Industrial Safety Act

This Act relates to safety standards in operations and maintenance.

3. Management

(a) Overall

No serious problems have been reported on the two-tier level of government on the overall management of sewerage and sewage treatment systems. All municipal plans for sewers and lift stations must receive approval from the Metropolitan Corporation.

Since the inception of the Metropolitan structure, no area municipality has ever considered itself sufficiently aggrieved to appeal to the Ontario Municipal Board, although provisions for such action are provided in the Metropolitan Act. On the contrary, the feeling of most engineering departments was clearly stated by one municipal official:

"We work very well with other municipalities and with Metro, since we are all professionals. No one wants to build an empire; we just want to do a good job at the level at which each of us is most efficient".

(b) System Capability

i) Metropolitan Corporation

The Metropolitan system is considered to be approximately 80% complete. Its present book value is established at $450,000,000, while expenditures over the next five years are budgetted for a total of $210,000,000 as follows:
(figures expressed in millions of dollars)

	1975	1976	1977	1978	1979	Five Year
Trunk Sewers:	7	7	3	2	2	21
Plants:	26	54	52	34	23	189
Totals:	33	61	55	36	25	210

From the foregoing, it can be seen that significant expenditures for the treatment facilities are still required to satisfy the ever increasing flows and to meet the higher effluent standards set by the Province of Ontario. Special emphasis will be placed on the three major treatment plants while improvements to the North Toronto plant will be restricted to improved effluent quality. No additional capacity is foreseen here. Treatment capacities, expressed in average daily flows are summarized:

	Present Capacity	New Capacity at Completion of Current Expansion Program
	MGD	MGD
Main Treatment Plant	180	200
Humber Treatment Plant	70	90
Highland Creek Treatment Plant	16	64
North Toronto Treatment Plant	10	10
	276	364

Peak flows varying from 150% to 200% of average daily flows can be handled at these plants.

The metropolitan trunk sewer system is quite adequate, with reasonable safety in capacity. However, some older, larger sewers require considerable maintenance.

ii) City of Toronto

The City is fully serviced by combined sewer systems. A sewer separation programme was started some 10 years ago and will require another 15 years to complete. During the first 10 years of this programme, flooding complaints have substantially decreased

since emphasis has been placed on the most overloaded section of the system. A budget of $10,000,000 has been allocated annually for this program.

iii) Borough of Scarborough

Approximately 85% of the Borough is serviced by sanitary sewers, 10% by combined sewers, while 5% of the built-up area is still on septic tanks (no sewers). A ten to fifteen year programme covers the servicing of this remaining 5%, as well as extensions to the system due to new development. Also included is a sewer separation programme, although this portion is not actively pursued. A capital budget of 6.6 million dollars has been established for 1975 for sanitary sewer plus storm sewer construction.

iv) Borough of North York

All built-up areas are serviced by sanitary sewers, with no combined sewers in this Borough. The capacity is generally adequate for North York; no additional capacity is available however for sewage from outside the Borough such as Vaughan or Markham. Some older areas do require additional (relief) sewers, while some old, clay sewers require replacement. Expansion of the sewerage system is still required with future new developments.

v) Borough of Etobicoke

No combined sewers are in service in this Borough; only a limited area is unserviced, pending further developments therein. The system is considered adequate for its purpose.

vi) Borough of York

The Borough is fully developed; 35%

is serviced by separate sewers, while the remaining 65% is on combined sewers. In the west end of the Borough a detention tank is in service into which part of the combined sewer overflows is discharged and chlorinated prior to release in the Black Creek. Some restrictions are enforced on new developments to pond rainwater on roofs, parking lots, etc. so as to restrict the heavy discharge into combined sewers. A sewer separation programme has been established for implementation during the next ten to 15 years.

vii) Borough of East York

Approximately one third of the Borough is serviced by separate sewers while the remainder is on combined sewers. The system can handle up to twice the average daily flows and is considered adequate for its purpose. Some ponding of rainwater is provided at commercial properties (viz. the East General Hospital) while further peak rain flow discharge into the combined system is restricted at many individual road drainage catch-basins.

In 1962, a sewer separation programme of some 11 million dollars was established. A programme was initiated in 1964 with an expenditure of $500,000 allocated annually until 1973. The separation programme's main objective was to eliminate flooding, but lack of complaints served to terminate the project in 1973.

(c) Additional System Capacity

The sewerage system is quite adequate for the present Metropolitan Area. Significant additional capacity for areas outside Metro is not available in the local sewerage systems, and additional trunk sewers would be required for

such purposes. In addition, further expensive additions to the treatment facilities would be required to properly treat such additional flows, if it were decided to convey sewage from outside the metropolitan area to its major treatment plants.

(d) Treatment

The present level of treatment provided at the four metropolitan treatment plants meets all provincial standards. Throughout the North American municipal field, higher degrees of treatment - so called "tertiary treatment" - are being reviewed and in certain U.S. areas such higher effluent standards are indeed legislated. Full tertiary treatment is not expected by the Ministry of the Environment of the Province of Ontario in the foreseeable future. However, if such requirements become reality, they would impose on the Metropolitan Corporation considerable additional expenditures. Notably, pumping of all plant effluents might well become a necessity, while depending on the physical extent of the facilities, it might be required to extend the plant sites at the Main Plant as well as at the Highland Creek Plant by dumping fill material into Lake Ontario, to accommodate such plant extensions.

Treatment of stormwater runoff, especially of combined sewer overflows is likely to be legislated in due course. No provisions for such treatment are made at present at the overflow structures with the exception of the Borough of York where part of its westerly overflows are collected and chlorinated in a recently installed holding tank. To conform with probable future requirements for restriction of sewer overflows, overflows could be reduced or eliminated by various sewer separation programs, by restricting high storm-inflows through street or roof ponding or by improved utilization of the holding capacity of the sewer system.

(e) Industrial Waste

The Metropolitan Corporation has established an Industrial Waste Bylaw, which restricts the discharge quantities and/or concentrations of certain wastes to the sewerage system. The area municipalities have either their own bylaws, similar to Metro's, or else they use the Metro bylaw exclusively. Only the North York bylaw differs in some areas.

The checking and enforcing of the Industrial Waste By-laws must be done by the area municipalities, since the industries discharge into their local sewers. However, the Metropolitan Corporation assists the area municipalities in this regard and, in many cases, performs the actual sampling and checking. Normally industrial inspections are restricted to twice yearly due to the magnitude of work involved throughout the metropolitan area. The Borough of Scarborough has appointed a pollution control officer to establish an industrial process inventory and to assist in industrial discharge control.

Excellent cooperation between the staff of Metro and those of the area municipalities is reported in this field.

(f) Odours

The number of odour complaints emanating from sewer manholes is insignificant. However, nuisance complaints from the treatment plants are repeatedly reported. Measures are currently underway at each of the major plants to reduce such odours.

(g) Replacement of Private Connections

In some of the older areas private sewer connections are now inadequate either in size or physical condition or both. The cost of replacement is high and private citizens are seeking municipal support. No legal means are provided for such action, and if the municipalities become involved the implications could be serious for both legal and financial reasons.

4. Financing

The Metropolitan Corporation as well as the area municipalities follow the policy of charging most of the costs of sewage works against rateable property. In addition, the Metropolitan Corporation collects a 10% surcharge on its waterbills to the area municipalities as a sewage service charge to cover part of its operational costs for sewage work.

Metro further receives a provincial subsidy of 15% on all its sewage capital works. It has discontinued collection of its share of any sewer impost which might be collected by the area municipalities.

The City and the Boroughs charge their costs against rateable property through local improvement charges and general taxes as well as by collecting a sewer "impost" (as a lump sum cost) from new subdivisions and redevelopments. They further receive a 25% subsidy from the Metropolitan Corporation on those works which have an obvious pollution control benefit. Subsidies from the Ministry of Transportation and Communications are available for storm sewer construction. In addition, the City of Toronto collects from its individual users a sewage service charge on the water bills varying from 18% to 22%. The Metropolitan Toronto Act provides that such sewage service charges can only be used for offsetting the cost of operation of sewage works. None of the Boroughs applies such a service charge.

5. Summary

In summary, it can be stated that the sewerage and sewage treatment systems in the Metropolitan Toronto area have adequate capacities to cope with the current conditions. Programmes are underway to keep abreast of replacing obsolete facilities, to provide for increasing flows and higher treatment efficiencies, to reduce discharge of untreated sewer overflows and to provide services for new development. Floodings have been greatly reduced through the implementation of the sewer separation programmes, and maintenance procedures are well established. Treatment of sewage meets the provincial minimum standards. Cooperation between the Metropolitan Corporation and the area municipalities in this field is excellent.

The following items should be noted:

i) The various Industrial Waste Bylaws are not quite uniform throughout the area; checking of the industrial waste discharge into the sewer system is often restricted to once or twice yearly. All sampling and control is done by the area municipalities, assisted by the Metropolitan Corporation.

ii) Although a practical working arrangement has been established for the structures diverting the area municipalities' sewers into Metro's intercepting sewers, the actual legal responsibility is not quite clear.

iii) The problem of high peak flows collected by combined sewers cannot completely be solved with separate sewer systems. Separate sanitary sewers usually still receive heavy stormwater infiltration, thereby straining the sewerage and treatment system capabilities.

iv) Concern has been expressed in several circles on the problem of replacing ancient private connections on private property. Many such connections are inadequate in size or physical condition. The cost of such replacements are reaching considerable proportions and many private citizens are demanding municipal support. No legal means are provided for such action and if the municipalities become involved the implication could be serious, both for financial and legal reasons.

v) Due to the debenture financing of portions of the sewerage programs, Ontario Municipal Board approval is required for projects on an individual basis as opposed to approval of an annual program. As stated under the "Water Supply and Treatment" section of this report, such procedures have been found costly and time consuming.

vi) Costs are mostly charged on taxable properties through sewage "impost" and/or through general taxes. Relatively little is charged through sewage service rates on water bills. Increasing emphasis on such sewage service rates has been under serious discussion in several area municipalities.

SECTION C - STORM WATER MANAGEMENT

1. General

Under Part IV, Sewage Works, The Metropolitan Toronto Act, 1954, the Corporation assumed responsibility for collecting, treating and disposing of land drainage from the area municipalities. However, since the formation of Metropolitan Toronto, land drainage has largely been left to the area municipalities with improvements in major watercourses effectively conferred to the Metropolitan Toronto and Region Conservation Authority.

Local land drainage systems which have evolved in the member municipalities vary depending mainly on the period of major system construction. In the City and the Boroughs of East York and York, the system framework was established during the early twentieth century. These areas, with minor exception, are serviced by combined sewers. Within the Boroughs of Scarborough, North York and Etobicoke storm sewers and roadside ditches constitute a separate storm system which provides local drainage.

Depending upon both the presence and size of natural valleys, watercourses may be improved as open channels or enclosed as storm sewers for the purpose of directing storm water to major streams. Open watercourses have been employed almost entirely by Scarborough as trunk drainage facilities while the topography in the Boroughs of North York and Etobicoke has dictated that numerous natural waterways be enclosed.

2. Legislation

(a) Municipality of Metropolitan Toronto Act

The responsibilities of the Metropolitan Corporation in providing an adequate system of

inter-municipal land drainage is defined in the Municipality of Metropolitan Toronto Act, Chapter 295, Revised Statutes of Ontario, 1970. Provision is made for the Corporation to construct, maintain and manage sewer systems and to improve watercourses in order to regulate the manner, extent and nature of the reception and disposal of land drainage. In addition to these powers, the Corporation may establish standards for the design and maintenance of local drainage systems connected to Metropolitan works or watercourses and approve the connection of local systems to Metropolitan works.

Additionally, the Metropolitan Corporation may enter into agreements with local or regional municipalities outside the metropolitan area for the purpose of receiving and disposing of land drainage. These agreements may be valid for a maximum period of twenty years and may be renewed for an additional term.

(b) The Conservation Authorities Act, 1970

This Act defines the responsibilities of a conservation authority in conserving the natural resources within the physical boundaries of a watershed. An authority may be formed with jurisdiction over a watershed, or a group of watersheds, upon petition to the Province of Ontario by the majority of municipalities situated within the drainage boundaries.

In 1957, the Metropolitan Toronto and Region Conservation Authority was established encompassing the drainage areas of nine major streams tributary to Lake Ontario between and including the Etobicoke Creek and Carruthers Creek. Flood control and water conservation has remained one of the important programmes of the Authority. Under the provisions of the Act, the Authority is able to achieve its water management objectives by erecting works and structures thereby controlling the flow of surface waters and preventing flooding. Ontario Regulation 735/73 has been further adopted by the Authority under the provision of the Act to supplement the physical works carried out for flood control purposes. This Regulation serves to prohibit

building in an area susceptible to flooding during a regional storm, placing of fill in areas over which the control of flooding or pollution or conservation of land may be affected and altering in any way an existing channel of a watercourse.

3. Management

(a) System Capability

Despite the fact that local drainage has largely been developed as individual systems by the area municipalities, the capacity to serve is uniformly acceptable. In the City, excessive storm flows have been experienced within the combined sewers due to continued redevelopment. The system is being revitalized through a programme of constructing relief sewers designated as road sewers. This programme has been underway for the past ten years and is scheduled for completion in 1990. Flooding is to be alleviated and a measure of pollution control effected by reducing the combined sewer overflows during period of rainfall. This is achieved by directing catch basin inflow and drainage from new buildings to the road sewers thereby relieving the existing combined sewer. With eventual completion of the road sewer programme, the present combined sewers will essentially become sanitary sewers. The road sewers have been constructed on a priority basis to remedy situations of frequent flooding. The substantial reduction in flooding complaints during the last ten years attests to the effectiveness of the programme.

The combined sewer system in the Borough of York reportedly is adequate with few complaints received over the last five years during even the most severe storms. However, a separation programme is also underway in the Borough with completion expected in 1990. Retardation of storm water runoff is actively pursued as a method of reducing peak storm flows. Storm water holding tanks are installed at apartments with controlled discharge to the sewers. A further reduction of combined storm water peak flows is effected by a detention tank in which overflows are chlorinated before discharge to the Black Creek.

In the Borough of East York, the sewer separation which was initiated in 1964 has recently been terminated due to a lack of flooding complaints. The construction of separate sewer systems has continued in redeveloped commercial and high density residential areas. At present, about two-thirds of the municipality is served by combined sewers and the remainder by a separate system. With the exception of redeveloped areas, the system may be regarded as complete. The installation of orifice plates in catchment basins has proven to be an acceptable method of reducing combined sewer flooding in residential areas while delaying further extension of the separation programme.

Land drainage in Etobicoke is provided by roadside ditches and storm sewers. The system, based on a two-year design storm, is considered adequate with flooding occurring infrequently. Flooding complaints have usually been caused by surcharging of the sanitary sewer system due to illegal storm water entry connections. Considerable effort has been expended to remedy this situation.

Drainage systems within the Boroughs of Scarborough and North York were reported to be functioning well with few complaints received concerning flooding.

In general, very little structural maintenance is required in those municipalities with piped storm sewers. More usual is the need to refurbish house connections in relation to combined sewers.

(b) Inter-Municipal Drainage

In order to satisfy local drainage requirements where natural drainage traverses political boundaries, a number of working agreements have been

established between area municipalities. Capital and maintenance costs of storm drainage are shared by the City and the Borough of East York in the Danforth Avenue area. Reportedly a less satisfactory agreement exists between the City and the Borough of York. A successful resolution of drainage problems between Scarborough and North York has been reached with agreements to deal with construction of storm sewers.

Where agreements have been made between area municipalities and an extra capacity is provided within the downstream municipality, a charge to defray the extra capital cost is levied on the upstream municipality. No charge is, however, made for subsequent service or maintenance.

Less success in reaching cost sharing agreements for drainage facilities is evident between the Boroughs of Scarborough, North York and Etobicoke and the Regional Municipality of York together with its member municipalities. While capacity has been reserved in trunk drainage works within Scarborough for upstream development in the Town of Markham, these facilities are extended only to the municipal boundaries and effectively terminated. A similar inability to reach agreement has led North York to construct trunk sewers up to the northern municipal boundary with sufficient capacity for drainage within the Borough only. Progressive development within the Town of Vaughan and Markham will eventually render the natural drainage system inadequate and necessitate the construction of east-west collector sewers which will discharge to the main rivers and streams.

A prime concern of Etobicoke is the overloading of storm sewer facilities within the Borough due to the expansion of Toronto International Airport in Mississauga. Little progress has been made in seeking assistance from either the Ministry of Transportation and Communications, the Federal Government or the City of Mississauga to alleviate this problem.

Jurisdiction over the primary watercourses within the metropolitan area has effectively been administered by the Metropolitan Conservation Authority. Co-operation among the Authority,

the Metropolitan Corporation and the individual member municipalities is considered to be excellent. The Authority is viewed as an able organization which is well equipped to deal with inter-municipal drainage problems in the roles of both co-ordinator and administrator of works. The provision of provincial grants through the Authority for capital works is of added benefit to the Metropolitan Corporation.

For the purposes of providing adequate drainage and erosion control works for watercourses within Metropolitan Toronto, a classification system has evolved based upon the drainage area of the individual stream. For those watercourses with drainage areas exceeding one thousand acres, the Authority has assumed responsibility for the preparation, design and execution of approved flood control and erosion control projects in co-operation with the Conservation Authorities Branch of the Ministry of Natural Resources. The Municipality of Metropolitan Toronto is assessed the Authority's share of cost for such projects. For those minor watercourses draining less than one thousand acres and which are considered to be of only local significance, the Boroughs and City have assumed responsibility for all works. The Metropolitan Conservation Authority may be requested to review design standards and adequacy of control works for these minor streams.

With the recent spread of intense urbanization to the upper portions of the watersheds tributary to the metropolitan area, increased runoff and stream flows have been experienced on the major watercourses draining to Lake Ontario. This changing pattern of runoff has caused concern to the Authority and area municipalities regarding the impact of these increased flows, which can lead to flooding, increased erosion and damage to recreational developments and previously constructed flood control works in the lower reaches of these watercourses. To a lesser degree, this problem has been manifested on smaller streams within the metropolitan area by the construction of storm sewers which ultimately discharge to the watercourse.

4. Land Drainage Rate Structures

Under the Municipality of Metropolitan Toronto Act, the Metropolitan Council may charge benefiting area municipalities for the capital costs of drainage works and may impose an additional service rate to cover a portion of the annual cost of operation and mantenance of these facilities. With the Metropolitan Toronto and Region Conservation Authority providing an opportunity for a less costly and a more acceptable inter-municipal drainage solution, provisions under The Metropolitan Act have been employed to assess Metro's share of the cost against the area municipality in which the work is located. For those streams or rivers designated as major watercourses, having a drainage area over two thousand acres or considered as being of Metropolitan significance, the Metropolitan Corporation as the benefiting municipality accepts the full cost of the Authority's share of any works.

As provided in the Conservation Authorities Act, the Government of Ontario contributes money in the form of grants to the Authority up to fifty percent of the cost of flood control.

5. Summary

In the years since the Metropolitan Corporation was incorporated, a system of storm water drainage has evolved that provides a high degree of service to the metropolitan area. The varying approaches adopted by the area municipalities, namely combined sewers, storm sewers or improved watercourses, to achieve this objective depend mainly on local topography and the age of the sewer system. Those municipalities which experienced extensive development by the early part of the century have employed combined sewer systems for sanitary and land drainage purposes. Continued urbanization and redevelopment in these areas has resulted in increased storm runoff which has given rise to flooding complaints. In response to the challenge of alleviating this problem and in light of growing public awareness with respect to storm water pollution, extensive programmes of sewer construction have been undertaken for the purpose of establishing separate sewer systems.

Although the 1954 Metropolitan Act outlines specific powers to be assumed by the Corporation with respect to inter-municipal land drainage, the area municipalities have largely solved these problems by direct working agreements with adjacent municipalities. In those instances involving major watercourses, the presence of the Metropolitan Toronto and Region Conservation Authority has greatly facilitated the implementation of effective flood control measures. The cooperation achieved between the area municipalities, the Corporation and the Authority has served as a strong basis for the development of flood control and water conservation programmes within the watersheds which drain the Metropolitan area and portions of the Regional Municipality of York.

The present constraints evidenced by the legislation governing the two tier Metropolitan style of government have not hindered the development of an effective drainage system through area municipality participation and cooperation with government agencies. However, the continued urbanization of Metropolitan Toronto and neighbouring municipalities may give rise for concern in the following areas:

1. the need to construct adequate drainage facilities within the Boroughs of Etobicoke, North York and Scarborough to provide for flows from the Region of York and the need for corresponding cost sharing participation by the upstream benefiting municipalities;

2. the impact of the increased flows on the major watercourses of Metropolitan Toronto with respect to:

   - the rate of erosion and corresponding increase in deposition of sediment downstream
   - existing flood control facilities designed for lower flow conditions
   - recreational facilities which have been developed in the flood plains

SECTION D - SOLID WASTE MANAGEMENT

1. General

When Metropolitan Toronto was formed in 1954 responsibilities for solid waste management remained with the thirteen member municipalities. Thus each member municipality organized for the collection of solid waste and its disposal relatively independently. In some instances municipalities cooperated to provide common disposal facilities. An example of this was the construction and operation of the Ingram Drive Incinerator by the Boroughs of North York and York.

The collection service of each member municipality was conducted in accordance with a municipal by-law. This by-law effectively restricted the municipal collection service to residences and small commercial establishments. Larger commercial establishments and industrial operations therefore were serviced by private haulers operating under individual contracts with the generators. Municipal collection was on a twice-a-week basis with special provisions to collect residential bulky refuse. Some of the municipal collection was carried out by private haulers operating under contract to the municipality.

The collection service throughout the metropolitan area remains essentially the same today. The level of service is high; Metropolitan Toronto is one of the few areas in Canada or the United States with twice-a-week residential collection.

The original solid waste disposal methods varied from municipality to municipality. Some of the more completely developed municipalities used incinerators as their principal method of refuse reduction while others used varying forms of open dumps and sanitary landfills. The landfills were characterised by their small capacity and consequently short life. Several were privately owned and operated.

With time, pressure mounted on public agencies to provide more adequate space for landfill purposes. Metropolitan Toronto, at the request of several of the member municipalities operated a number of these landfills. Valley lands under the jurisdiction of the Metropolitan

Toronto and Region Conservation Authority were frequently used to accommodate small landfills to alleviate sporadically difficult disposal situations. By the mid-1960's all of the existing landfills had only a short future life, existing incinerators were inadequate to meet new air emission control standards and none of the member municipalities had long term disposal plans.

With the amendment to the Municipality of Metropolitan Toronto Act effected on January 1, 1967, Metro assumed responsibility for the provisions of disposal facilities for the five new Boroughs and the City of Toronto. Existing public disposal facilities were assumed by Metro. The disposal system at that time consisted of the following:

(a) Incinerators:
- Grand Avenue
- Don Valley
- Wellington Street
- Commissioner Street
- Ingram Drive
- Symes Road
- Dufferin (under construction)

(b) Several minor and virtually depleted municipal sanitary landfill sites.

(c) Four or five privately operated sanitary landfills for disposal of privately-collected industrial and commercial solid wastes.

Collection responsibilities remained with the member municipalities.

A significant feature of the amending legislation was the provision for Metro to establish disposal facilities within the Metropolitan Planning Area with the approval of the municipality in which the facility was situated, or failing such approval, the approval of the Ontario Municipal Board. The Metropoliton Planning Area at that time, included each of the outside municipalities with boundaries contiguous with the metropolitan limits. The effect was to give Metro a degree of freedom in establishing disposal facilities in areas outside its corporate limits. This was a freedom that had not been enjoyed by the member municipalities prior to 1967.

Metropolitan Toronto, anticipating impending new responsibilities, commissioned the development of a long term solid waste disposal plan in 1966. This plan was adopted in principle and the South Thackeray and Beare Road landfill sites were developed as interim sanitary landfill sites while the member municipalities were appointed as agents to complete their various sanitary landfill operations. Negotiations were commenced with various member municipalities for the establishment of refuse transfer stations and with the then Township of Pickering to establish the recommended Pickering landfill sites to the east of the Metropolitan Corporation.

Since then the Metropolitan Toronto Planning Area has been reduced so that it now conforms to the Metropolitan Toronto boundaries. The successive reductions coincided with the formation of the Regional Municipalities of York (1971) and Durham (1974). In addition, provincial regulatory approval requirements, including environmental hearing board reviews, have been formalized. Public awareness has increased significantly with regard to the establishment of solid waste disposal facilities. These circumstances have made it very difficult to establish new disposal facilities of any type but particularly outside the Metropolitan Toronto boundary.

At the present time the following events have transpired:

(a) The Grand Avenue and Wellington Street incinerator sites have been converted to transfer stations.

(b) The Don Valley incinerator has been closed.

(c) The Commissioner Street incinerator is under expansion as a conventional refractory incinerator.

(d) The Dufferin, Ingram and Symes Road incinerators are continuing with the addition of open air transfer at the Ingram and Dufferin sites.

(e) The South Thackeray landfill site is virtually complete and the Beare Road landfill site is within 1 or 2 years of completion. All original sanitary landfill sites have been completed.

(f) The Bermondsey Transfer Station, incorporating some capacity for shredding and metal separation has been constructed and is in operation.

(g) Two other transfer locations - Victoria Park and McCowan Road were approved but subsequently the McCowan Road site approval was withdrawn.

(h) The three major sanitary landfill sites in Pickering have been investigated extensively. One of them, the Liverpool Site will be opened in the near future.

(i) Proposals for rail haul of refuse have been received by the Metropolitan Corporation and as a result the CPR has been authorized to develop detailed plans, secured initial local approvals for transfer station locations and has advanced significantly in obtaining approval of a sanitary landfill site in the general vicinity of Port Hope, Ontario.

The rail haul and disposal proposals were solicited as a result of difficulties experienced in providing disposal for the refuse generated in western Metro. Landfill sites were extremely difficult to obtain. Preliminary design of a heat recovery incinerator was completed and although the necessary zoning changes were secured, extreme difficulties in establishing the incinerator were foreseen.

(j) Significant quantities of sewage sludge and other liquid or semi liquid industrial waste continue to be disposed of at landfill sites.

The culmination of these events represents the status quo at the present time.

In addition, Metro has continued to receive and/or participate in the development of a number of proposals for various facilities for treating portions of its solid waste. These include:

(a) Proposals from both Canacology and Anglo-Canadian Paper interests to provide separation facilities along with capability for material reclamation.

(b) A study, "Watts from Waste", has been completed in conjunction with provincial authorities which has resulted in the initiation of design of a

facility primarily to process a large portion of refuse through a 1200 ton per day unit to provide supplementary fuel to some of the boilers at the Lakeview generation station of the Ontario Hydro on a trial basis.

(c) A proposal from a private consortium to establish a heat recovery incinerator in the downtown area.

(d) Participation in the development of a 200 ton per day experimental separation facility. This facility is now under construction.

(e) A proposal, as a result of a long term heating study by the City of Toronto, to integrate the various downtown central heating systems and to permit the utilization of refuse to provide the base load energy requirements. Several activities designed to implement this proposal are underway.

(f) Various proposals to separate and utilize the tin cans in incinerator residue. One of these proposals has been accepted and is operational now.

(g) Proposals to provide pyrolysis systems.

(h) Proposals to establish major privately operated sanitary landfills outside Metro.

(i) Proposals to establish privately operated transfer stations in the downtown area.

Metropolitan Toronto also has been designated by the Province as one of the initial municipalities to participate in the development of a separation and reclamation station in support of the implementation of new provincial policies in this regard.

From these experiences it is apparent that developing the solid waste disposal system in the Metro area has been fraught with long time delays, a great deal of frustration, expansive involvements with many public hearings, requirements to analyse many various proposals for systems in various states of development, and as a result, little confidence in predicting detailed future disposal facilities.

Because of the number of steps necessary to gain approval of a disposal facility and the fact that the establishment of the facility can falter at the last step, the implementation of the long term system has been delayed. For instance, no new sanitary landfill sites have actually been put into operation since 1968 although intensive efforts have been directed to this end. Because of this the establishment of transfer stations, essential elements in the system, has been significantly delayed.

The location of the existing disposal facilities are shown on Figure 3 which appears at the end of this report.

The collection services have continued to improve in efficiency. This has resulted from collection equipment improvements and intensive efforts by member municipality staffs, with the cooperation of the unions, to improve the productivity of the collection forces. A significant feature of the collection services has been to participate in the separate collection of newspapers, bundled separately by homeowners, for recycling purposes. Some of these programs are continuing, in spite of the subsidies required because of the currently depressed waste newspaper markets, to avoid possible losses of momentum in citizen participation in these programs.

2. Legislation

(a) The Municipality of Metropolitan Toronto Act being Chapter 295 of the Revised Statutes of Ontario 1970, provides a clear definition of the division of responsibilities for solid waste management between the Metropolitan Corporation and the member municipalities.

Metro is responsible for disposal and the member municipalities are responsible for collection.

This division of responsibility has been common in the legislation enacted in other Regional Municipalities across the Province.

The Metropolitan Toronto Act also defines the method of financing the cost of disposal services. Metro is permitted to charge directly for disposal of solid waste delivered by private haulers, individuals, etc. This has resulted in the establishment of a rate

structure based on a cost per ton for disposal of this type of solid waste. Metro is prohibited from charging on this basis for disposal of solid waste collected by member municipalities and their agents. Costs for the disposal of these wastes are recovered through general revenue funds. The financial provisions of the Act pertaining to solid wastes prohibited the operation of the solid waste disposal service on a user basis.

(b) Other Legislation Affecting Solid Waste Management

(i) Environmental Protection Act

This Act and its regulations have significant effects on solid waste management practices in Metropolitan Toronto. Public and private collection vehicle fleets are required to operate under provincial permits. Processing and disposal facilities are subject to detailed regulatory provisions including requirements to appear before the Environmental Hearing Board in order to secure the necessary provincial permits to construct and operate facilities. The mutual cooperation of the Province and Metropolitan Toronto in developing standards for design and operation of processing and disposal facilities has enhanced the development of the provincial regulations with time.

(ii) The Municipal Act

This Act as it affects solid waste management practices determines procedures and limitations on approval for debenture financing for construction of processing and disposal facilities and making provision for the enactment of operating by-laws in respect of collection and disposal.

(iii) The Planning Act

The Planning Act, among other things, determines the procedures for designating or changing land uses. In general the Act permits specifically designated land uses in any area. All other uses are prohibited. The planning process has traditionally disregarded the requirement to provide specific lands for use as solid waste processing or disposal facilities. Thus the establishment of such facilities usually requires a change in existing land uses. The necessary procedure to effect land use changes adds substantial time and cost to the establishment of processing and disposal facilities.

(iv) Other Legislation

Labour Relations Act covers working conditions and facilities for the accommodation of collection and disposal staff.

Industrial Safety Act relates to safety standards in the operation of collection and disposal facilities. These activities are traditionally highly hazardous.

Metropolitan Toronto and Region Conservation Authority Act governs the activity of the Authority which is frequently a cooperating agency in the establishment and final use of sanitary landfill sites.

Construction Safety Act sets out regulations pertaining to the safety of construction projects as would apply to construction of incinerators and solid waste transfer/processing stations.

Various other federal and provincial acts and regulations have an impact on solid waste management practices in Metropolitan Toronto.

3. Management

(a) General

The assumption of disposal responsibility by Metro has proceeded smoothly. There is a high degree of co-operation between Metro and member municipalities. There is little pressure for changes in the division of responsibility.

(b) System Capability

(i) Collection

The provision of collection services in the solid waste management system in Metropolitan Toronto has been exemplary. The growth of the private sector into large sophisticated operations providing collection services to industry and commerce and in some instances to residential development has provided an incentive to municipal collection services to improve efficiencies. The mixture of the private and public sectors in the provision of collection services appears to be beneficial to the citizens in the provision of these essential services.

(ii) Processing and Disposal

The existing processing and disposal facilities are adequate for the present. The implementation of the long term disposal plan has been fraught with delays and frustrations. These delays have caused some member municipalities to face disproportionate hauling costs for their collection fleets because of longer than anticipated distances to disposal facilities. When the periods of time which are necessary to establish the required future disposal facilities are considered it is apparent that a crisis is developing in this essential public service.

(iii) Access to Areas Beyond Metropolitan Boundaries

Implementation of more sophisticated air pollution and sewage treatment systems creates increasing volumes of residue. The implementation of large scale reclamation or incinerator programs will continue to result in substantial volumes of residue. These residues can only be disposed of on land. The acceptance of the residue concept is essential in understanding the problems facing Metropolitan Toronto in solid waste disposal practices.

It is apparent that the long term disposal of these residues will necessitate access to areas outside the metropolitan boundaries. From an experience standpoint it appears that the accessibility of these areas has been decreased in recent years. If this process is not reversed Metro will face extremely high financial costs in the near future with probably unnecessarily adverse environmental impacts.

4. Financing

The financing of collection and disposal of major commercial and industrial wastes is accomplished by charging the generator a fee based to a significant degree on the volume of waste produced. These fees are collected by the private haulers and they in turn pay a disposal fee. The system is long established and appears to operate relatively smoothly.

The financing of collection services for residential and minor commercial wastes is accomplished by the member municipalities in their general taxation revenue. This system appears quite reasonable compared to alternative system which would probably involve collection of fees for individual residences, etc.

The financing of operating costs for processing and disposal services provided by Metro is accomplished in part by the collection of fees for disposal of major commercial and industrial wastes. The remainder of the operating costs are financed by proportioning the costs on an assessment basis to member municipalities. Capital costs are debentured. There have been efforts by Metro in the past to amend The Metropolitan Act to permit the operation of the disposal facilities on a utility basis. This would involve establishing disposal fees for all types of solid wastes. The fees would include operating and capital debt service costs. Such a system appears to have considerable merit.

5. Summary

The division of responsibility between Metropolitan Toronto and the member municipalities is clearly understood and appears to be optimum in providing efficient solid waste management services to the citizens of the Region.

The member municipalities are recognizing and responding to pressures for new methods of handling solid wastes from high rise and townhouse developments. Planning guidelines, although not entirely consistent among member municipalities, are being prepared to assist in the orderly development of such services.

The primary problem in the provision of solid waste management services is in the area of gaining public acceptance of the establishment of disposal facilities in a specific area. The concern of the individual citizen appears to be limited to having the solid waste picked up on an orderly basis and resisting the establishment of disposal facilities in any proximity. There have been suggestions that these problems cannot be solved by Metropolitan Toronto and that the disposal function should be assumed by the Province. While the provision by the Province of the necessary disposal

facilities may in fact ease the public acceptability problem it will not eliminate it. Increased public understanding of the essential nature of the service and the actual environmental impact of specific facilities would appear to be necessary in alleviating this problem.

SECTION E(1) - ENERGY SUPPLY - ELECTRICAL

1. General

Electrical service within the Municipality of Metropolitan Toronto is provided by six municipal electrical utilities. They are:

East York Hydro Electric Commission
Etobicoke Hydro Electric Commission
Borough of York Hydro System
North York Hydro Electric System
Toronto Hydro Electric System
Scarborough Public Utilities Commission

To comprehend the current situation of electrical supply in Metropolitan Toronto, it is important to understand the history of its development. The concept of the municipal electric utility is unique to Ontario. While similar organizations exist in the United States, they have not developed to the same extent elsewhere in Canada where the distribution and sale of electrical energy at the retail level generally remains the responsibility of the bulk power generation and transmission authorities.

The municipal electric utility had its beginning in the very early days of the power industry in the Province of Ontario. The forerunners of the municipal electrics as they exist today were the small privately or municipally-owned electric companies that generated, transmitted and distributed electricity in towns and villages for street lighting, electric street railway systems and small commercial and industrial consumers. In those early days of the industry, the rates charged for electrical service, particularly by the private companies, were not always a reflection of the true costs of production. In fact, in many instances, the rates were nothing less than exhorbitant. Moreover, even in those areas where power was sold "at cost", rates reflected the inflated levels inherent in small utilities lacking economy of scale. A general public outcry against the rates charged for electrical service ultimately led to the formation of a provincially-owned and operated bulk power generation and transmission authority with responsibility for the provision of electrical energy at cost to the various municipalities,

towns and villages. Thus was born the Hydro Electric Commission of Ontario.

The legislation that created Hydro did not compel the municipalities and townships to purchase power from Hydro. However, sufficient incentives and safeguards were developed firstly, to attract the municipalities and other potential customers, and secondly, to ensure that the financial integrity of Hydro and its municipal customers would be maintained. The various rules and regulations governing the relationship between Hydro and the municipal utilities have been refined over the years by means of appropriate legislation and are presently embodied in the Power Corporation Act.

The Power Corporation Act not only establishes the norms under which Hydro must operate but also sets forth certain conditions and constraints which the municipal electrics are obligated to accept should they undertake the purchase of power from Ontario Hydro. In addition to complying with the terms and conditions of the Power Corporation Act, the municipal electric utilities are also obliged to satisfy the requirements of the Public Utilities Act and The Municipal Act.

It is in this general framework that the six area municipal electric utilities operate within Metropolitan Toronto today.

2. Legislation - The Power Corporation Act

The Power Corporation Act specifies in considerable detail the powers granted to both Ontario Hydro and the municipal electric utilities. Those sections of the Act having greatest relevance to the relationship between Hydro and the municipal electrics are outlined below.

The Power Corporation Act states that any municipal corporation may apply to Hydro for the provision of electrical energy. Hydro is then obliged to provide to the corporation an estimate of the cost of supplying the power. The corporation, in accordance with the Municipal Act, must obtain the approval of a majority of the electorate, and, by means of a by-law, authorize the entering into of a contract for the required service with Ontario Hydro. The contract becomes binding upon approval by the Lieutenant Governor-in-Council and no

further assent from the electorate is needed.

Debentures which Metro may issue on behalf of electric utilities are generally excluded when the borrowing limits of the municipality are ascertained by the Ontario Municipal Board. Thus Metro is not burdened with additional debt, and implicitly, the debt is expected to be retired out of revenue generated by the sale of power.

Upon the conclusion of a contractual agreement with Ontario Hydro for the supply of power, the municipality may, with the approval of the electors, pass a by-law entrusting the construction of any works and the management and control of such works to a Public Utilities Commission. Within the Metropolitan Toronto Region, all of the boroughs except York have structured their Hydro electric systems as Commissions. In the Borough of York, the electric system is operated as a department of the municipal corporation.

The Power Corporation Act contains a provision whereby an annual amount is to be included in the cost of power such that the amount when established as a sinking fund at 4 percent interest per year over a period of forty years would be sufficient to defray the cost of works, repay debt, or to restore reserves or other funds used by Hydro to provide the service. The amounts so obtained are considered to represent the equity ownership of Ontario Hydro by the municipal electrics. Over the years, the funds contributed by the municipal utilities to the sinking fund have grown as has the return on the contributions. This return, known as the return on equity, is paid to the municipalities on an annual basis as a reduction in the cost of power. However, as the contracts made between Hydro and the various municipalities span a time period in excess of fifty years, the return to each municipality may vary considerably. In fact, while the older member utilities received a significant reduction in their annual power costs, the more recently incorporated municipalities received no monetary benefit. Within Metropolitan Toronto, the older borough utilities such as Toronto Hydro, East York and York have been in a favoured position for many years whereas North York, Etobicoke and Scarborough continued to contribute to equity without realizing a return on that equity. This somewhat

anomalous situation was rectified in 1974 when the municipal utilities and Hydro agreed that the return on equity would be phased out over a six year period. However, the cost of power will continue to contain a charge for system expansion which will be credited to the equity account of the municipal electrics.

One very important role assigned to Ontario Hydro under the Power Corporation Act is that of regulation and control of the municipal electric utilities. The powers conferred on Hydro in this regard are quite extensive. Only those areas relevant to this study are noted below.

Complaints:

Complaints may be filed with Ontario Hydro by a customer of a municipal electric utility and the Board of Hydro is obliged to hear and rule upon the complaint.

Rates:

Hydro has the right to approve and control, and, in certain instances, to fix the rates charged for electric service by the municipal electric utilities.

Debentures:

A municipal electric may not issue debentures or borrow funds for application to its power system without the prior approval of Hydro.

Capital Expenditures:

The annual capital budget of the municipal electrics is subject to review and approval by Ontario Hydro.

System of Accounts:

Ontario Hydro has the right to prescribe the system of accounts to be adopted by a municipal corporation or commission receiving power from Hydro.

3. Service and Service Area

Within the Municipality of Metropolitan Toronto each of the six municipal electric utilities services the area defined by the boundaries of their respective

boroughs. Etobicoke, East York, York and North York Commissions are responsible for electrical service only. Although the Scarborough Public Utilities Commission provides both electrical and water supply, these two aspects of the Commission's functions are quite separate and only the senior management personnel span both the water and electrical operations. In the case of the Toronto Hydro, a limited district heating system is operated within the downtown core.

4. Organization and Management

All of the utilities with the exception of York are structured as Public Utility Commissions. Each Commission comprises three members, two of whom are either elected or appointed, with the third member being the mayor of the municipality in an ex-officio capacity. Liaison with the municipal council is maintained by the mayor although the general manager of the utility may appear before council to provide certain required information. The general managers often attend council meetings particularly if a subject relevant to the electrical utility is on the agenda. By these means, communication is maintained between the senior operating management of the utility and the political level as represented by council. In addition, day to day communications are maintained at the staff level with other departments, notably public works, of the area municipality.

As mentioned, the structure of the electric utility within the Borough of York is somewhat different. The general manager of this utility reports to a committee known as the Hydro, Personnel and Public Relations Committee comprising two Alderman, one Controller and the Mayor (ex-officio). The general manager also reports to the Board of Control and to Council. There also exists a Management and Co-ordinating Committee which is responsible for changes in the staff level and in the responsibilities of the staff. The municipal treasurer acts as treasurer of the electric utility and the Board of Control exercises general financial control over its operations.

Of the five Commissions, only Toronto Hydro has Commissioners appointed, the others having elected Commissioners. While all of the general managers spoke

highly of the qualifications and dedication of present and past Commissioners, the ever present possibility of a particularly unqualified individual being elected to office is recognized. There is likely to be an increasing awareness and interest of the general public in the affairs of the municipal electric utilities as a consequence of recent, quite substantial, rate increases, although most of the general managers are prepared to accept the electoral process with its strengths and weaknesses.

Below the level of general manager, the six municipal electric utilities are organized in a somewhat similar manner. The principal operating functions existing within each utility are as follows:

Chief Engineer
Manager of Operations
Treasurer or Comptroller
Consumer Service
Administration
Personnel

Not all of the positions noted above are actually designated as such, particularly in the smaller utilities where an individual may assume responsibilities for more than one of the principal functions.

An approximate indication of the staff employed by each the six area utilities is given in the following table:

TABLE 1

NUMBER OF STAFF EMPLOYED

	Prof. Engineers	Office	Other	Total
Toronto Hydro	35	500	465	1,000
Etobicoke Hydro	6	119	123	248
East York Hydro	3	30	60	93
North York Hydro	15	175	210	400
Scarborough Hydro	9	-	-	270
York Hydro	3	35	92	130

The category headed "office" includes meter readers as well as staff normally associated with the administration of the operation. The "other" category refers to construction and maintenance forces and those employees located in service centres.

5. Operations

All the power sold at the retail level is purchased from Ontario Hydro. The sources of supply to the municipal electric systems are 29 major transformer stations located throughout the six municipalities. In general, the transformer stations are owned by Ontario Hydro although some anomalies exist, primarily because of historical developments. For example, certain of the municipal electrics own all of the facilities up to and including the secondary feeder circuit breakers in the transformer station. In other instances, the circuit breaker and the feeder circuit is owned by Hydro. A few of the transformer stations are located on land owned by the municipality and some of the buildings are owned by the municipality. This latter situation usually occurs where the property is used jointly by Hydro and the utility. For example, the municipality may have a service center located adjacent to the transformer station and the land use is common to both. However, this somewhat anomalous ownership does not appear to be a contentious issue. The trend would appear to be for the municipal electric to obtain ownership of all circuits and equipment up to and including the secondary feeder circuit breaker in the main transformer station.

While the technical practices of the various municipal electric utilities differ somewhat, the variations would only be of significance if at some future date the operations were consolidated under a single authority. In such an event, differences in voltage levels, phase angles and other technical features would make interconnection and integration difficult but not impossible. The principal technical advantage to be

gained from an integrated operation would be standardization of equipment and of design and operating practices. The dissimilarities that presently exist would tend to postpone the realization of certain of these technical benefits, at least until the older facilities become obsolete and require replacement.

The fact that the various municipal electric systems have followed different paths of technical developments does not imply lack of planning or forethought. The growth patterns and consequent needs of the municipalities have been and will continue to be somewhat unique and the electrical systems reflect this characteristic. The voltage levels and other technical standards and practices adopted by the municipal electric utilities are in keeping with the electric power industry as a whole.

6. Environmental Considerations

All of the utilities are very aware of the possible impact on the environment of their operations. Of particular concern are considerations relating to visual intrusion or aesthetics and noise (transformer hum). With regard to transformer stations, most of the municipal electric utilities employ so-called bungalow type substations which are designed to blend unobtrusively with the surroundings. Much of the major equipment may be contained within the sub-station and if underground cables are used for entry and exit , the facility may go completely unnoticed. Outdoor type sub-stations are also used but careful landscaping is used to minimize the visual impact. Low noise level transformers may be specified which when combined with proper sound proofing generally eliminate the noise problem.

Certain of the utilities allocate a portion of revenue for the undergrounding of overhead lines. Etobicoke Hydro spends about $1 million per year in

providing underground facilities to shopping plazas, new residential sub-divisions and commercial buildings. In North York, 30 percent of the system is already underground and 2 percent of the annual revenue of the utility is dedicated to financing underground facilities. Scarborough Hydro has adopted a policy whereby all new industrial, commercial and residential developments must be supplied from underground systems. In the older developments, the residents are given the opportunity of choosing whether existing overhead circuits are placed underground. In the Borough of York, most of the service is overhead with underground being used to supply the larger buildings. The majority of the 13.8KV network serving downtown Toronto is underground with a mixture of overhead and underground being utilized in the outlying areas. An additional problem in the City of Toronto is the high voltage 110KV circuits of Ontario Hydro which must be routed through high density areas to supply the major transformer stations.
In the core area these circuits are placed underground coming to the surface and connecting with steel tower transmission lines in the suburbs.

None of the utilities reported any major environmental problems. However, some concern was expressed about the siting of future major transformer stations. While this task is the responsibility of Ontario Hydro, the sites must be found within the municipalities and failure to do so will have a significant impact on the municipal electric systems.

7. Reliability

The issue of reliability or continuity of service is of paramount importance to the municipal utilities. All agreed that the reliability of supply from Ontario Hydro was adequate at the present time. However, some concern was expressed regarding Hydro's ability to maintain its current standard of reliability. The municipal electrics are all firmly of the opinion that any deterioration of the service reliability offered by Hydro would be detrimental to their operations.

A few years ago, several utilities, Scarborough, North York, Mississauga and Etobicoke established a Working Committee on Reliability. The objectives of the committee were to determine firstly,

a statistical measure of the standard of service provided to the consumer, and secondly, whether or not the consumer found the service to be sufficiently reliable. While the work has not been given a high priority, Scarborough Hydro was able to report that the reliability of the service is statistically higher than 99 percent and out of approximately 7,750 customers surveyed, 2,400 consider the service to be most satisfactory, 5,200 view it as satisfactory and 150 are of the opinion that the service is unsatisfactory. Thus, it would appear the reliability of electrical service is more than adequate.

8. Load Growth

The basis for planning the expansion of an electric utility operation is the anticipated load that the utility must meet. Table 2 summarizes the forecast annual growth rates and peak power demands for each of the systems. By comparison a growth rate of 7 percent per year is considered as being typical for the industry. Variations amongst the utilities reflect such factors as land available for development and trends in redevelopment. Toronto Hydro, for example, foresees that the increase in demand could be even less than forecast if development in the core area is limited.

TABLE 2

FORECAST ANNUAL GROWTH RATE
AND PEAK POWER DEMAND

	Annual (1) Rate (%)	Power (2) Demand (KW)
Scarborough Hydro	8 - 9	435,000
North York Hydro	7 - 8	700,000
Etobicoke	less than 7	409,000
York Hydro	4½ - 3½	140,000
East York Hydro	6	135,000
Toronto Hydro	4½ - 5	1,100,000

Note: 1. Average annual rate for the period 1975-1980
2. Approximate peak power demand as of December 1974

Nearly all of the municipal electric utilities observed that the peak demand in December 1974 was lower than anticipated and, in some cases, lower than the previous December peak. This is attributed to relatively mild weather conditions.

None of the utilities were able to report any marked increase in the use of electricity for space heating. Such a trend might be expected as a consequence of increased fuel oil and natural gas prices. East York Hydro did note that some consumers were being conservative in their use of electrical energy but, as yet, the impact is not significant.

In summary of this subject, the municipal electrics are carefully appraising short term future trends in consumption. A number of conflicting forces presently exist in the consuming sector. Increased electricity rates and the possible development of a conservation ethic may dampen growth whereas higher prices for hydrocarbon fuels may cause a transition to electricity for space heating and a corresponding increase in consumption. As yet, the trend is not clear.

9. Financial Policies and Rate Structures

The present policy of most of the municipal electric utilities is to finance capital expansion out of

current revenue. North York Hydro commissioned an independent study in 1974 to determine whether capital expansion should be funded out of revenue or by the raising of debt capital. The study concluded that system expansion should be financed out of current revenue, thereby confirming North York Hydro's approach. On the other hand, Scarborough Hydro favours the issuing of debentures and the current policy of this utility is to maintain about a 50/50 division between debt and revenue financing.

All of the utilities recognize that some debt financing is necessary during periods of high growth or when, as a result of the amalgamation of two municipalities, one of the utilities must purchase the assets of another. However, in general, the utilities take pride in operating a relatively debt free system. The extent to which each municipal electric has been successful in achieving its policy objectives is indicated by the financial ratios given in Table 3.

Ontario Hydro charges the municipal electric utilities a uniform rate of 4.5 mills/kwh for energy purchased plus a demand charge ($/KW) that varies to reflect the actual cost of the facilities required to deliver the power. The demand charge for each municipal electric in the Metropolitan Toronto Region is as follows:

East York Hydro	-	$49.31/KW/year
Scarborough Hydro	-	$49.52/KW/year
North York Hydro	-	$48.89/KW/year
York Hydro	-	$48.99/KW/year
Toronto Hydro	-	$48.59/KW/year
Etobicoke Hydro	-	$50.03/KW/year

While the differences in demand charges are relatively small they are one of the factors which result in different rates being charged by the individual electric commissions.

The number of customers, energy consumption and revenue for each class of customer served by the six municipal electric systems is given in Table 4. The major customer classifications adopted by the utilities are residential, general service and large user. Some of the utilities further divide general service into commercial and industrial. Where figures for these latter two classifications are available, they have been presented in Table 4.

TABLE 3

APPROXIMATE DEBT POSITIONS

		EAST YORK	ETOBICOKE	NORTH YORK	SCARBOROUGH	TORONTO	YORK
DEBENTURES ISSUED							
	1970	-	-	-	$ 110,725	-	-
	1971	-	$500,000	-	1,557,715	-	-
	1972	-	-	-	1,151,000	-	-
	1973	-	-	-	-	-	-
	1974	-	-	-	3,101,691	-	-
DEBENTURES ISSUED as % of Increase in Net Plant							
	1970	-	-	-	8.5	-	-
	1971	-	25.3	-	80.4	-	-
	1972	-	-	-	38.6	-	-
	1973	-	-	-	-	-	-
	1974	-	-	-	78.1	-	-
DEBENTURES OUTSTANDING* as % of Net Plant							
	1969	26.3	22.9	18.1	23.4	7.8	0.2
	1970	23.5	19.1	15.0	20.0	6.0	-
	1971	21.4	17.4	12.2	21.6	4.6	-
	1972	19.7	14.4	9.8	18.4	3.2	-
	1973	18.3	9.9	5.9	14.2	2.0	-
	1974	16.5	7.8	4.2	18.7	0.8	-

* Calculated from the differences between the Total Debentures Outstanding and the amounts contained in the Sinking Funds.

TABLE 4

OPERATING STATISTICS - 1974[1]

	YORK	SCARBOROUGH	NORTH YORK	EAST YORK	ETOBICOKE	TORONTO (1)
Customers (No. of meters)						
General Service (Residential	31,103	75,470	121,500	26,292	81,156	180,021
(Commercial	4,024	947	13,900	2,581	4,661	31,339
(Industrial		912		117	1,769	
Large Users	3	4	2		3	16
	35,130	77,333	135,402	28,990	87,589	211,376
Consumption (KWH)						
Residental	245×10^6	838×10^6	$1,213 \times 10^6$	193×10^6	750×10^6	$1,211 \times 10^6$
General (Commercial	387×10^6	742×10^6	$2,298 \times 10^6$	246×10^6	663×10^6	$3,756 \times 10^6$
Service (Industrial		845×10^6		173×10^6	$1,074 \times 10^6$	
Large Users	96×10^6	166×10^6	99×10^6	65×10^6		$1,235 \times 10^6$
	728×10^6	$2,391 \times 10^6$	$3,610 \times 10^6$	677×10^6	$2,487 \times 10^6$	$6,202 \times 10^6$
Revenue (Dollars)						
Residental	(1) 3.4×10^6	(1) 11.1×10^6	19.6×10^6	3.13×10^6	(1) 11.07×10^6	19.58×10^6
General (Commercial	$4,9 \times 10^6$	16.2×10^6	32.8×10^6	3.58×10^6	18.78×10^6	51.9×10^6
Service (Industrial				2.20×10^6		
Large Users	0.9×10^6	1.2×10^6	1.1×10^6	0.74×10^6	1.97×10^6	13.2×10^6
	9.2×10^6	28.5×10^6	53.5×10^6	9.65×10^6	31.82×10^6	84.68×10^6

Note: 1. Operating statistics for 1974 are not available for every utility. Figures shown with (1) are to December 31, 1973

The rates charged by the municipal electrics generally follow the classifications outlined above although a few special purpose rate classifications exist. Typical of these are flat rates for neon and other electrically lighted signs, commercial cooking and commercial heating rates. Electric water heaters are also charged on a flat rate basis. The water heater rate may vary depending on the capacity of the tank and the wattage of the heating elements. Street lighting is also a separate classification but the sale of electricity for this purpose is an intra-municipal transaction.

The rates charged by the six municipal electrics for residential service are presented in Table 5. A direct comparison of these charges is difficult as not only do the rates per block vary but also the blocks are different. A comparison can be effected by applying the rates to say a 1,500KWH consumption, an amount which is typical for a 2 month period. The bill to the consumer, excluding any discounts, would be as follows:

Toronto Hydro	$27.48
East York Hydro	$26.60
Scarborough Hydro	$27.40
North York Hydro	$29.50
York Hydro	$25.10
Etobicoke Hydro	$28.00

The difference in the bills between the highest, North York , and the lowest, York Hydro, would be about $26.00 per year. It should be noted that the above figures are based on the rates charged for standard residential service. A special all-electric rate exists for residential service that includes space heating. These latter rates have not been tabulated in this report.

The rate structures applied to the general service category of service are difficult to compare directly. Some utilities charge the same rate for small commercial, commercial and industrial consumers whereas others have a different structure for each of the above mentioned classes. Table 6 shows the rates that apply to small commercial and commercial customers. In North York and York, the same rates would also apply to industrial customers. The remaining municipal electrics, East York Hydro, Scarborough Hydro, Toronto Hydro and Etobicoke Hydro

TABLE 5

COMPARISON OF RESIDENTIAL RATES

Block	North York[1] ¢/KWH	East York[1] ¢/KWH	Scarborough[1] ¢/KWH	York[2] ¢/KWH	Toronto[2]* ¢/KWH	Etobicoke[2] ¢/KWH
1st 100 KWH	5.2	4.6	5.2			
Next 400 KWH	2.35	2.0	2.05			
Balance	1.49	1.4	1.4			
1st 50 KWH				4.4	5.3	
Next 200 KWH				1.8	2.31	
Balance				1.35	1.6	
1st 250 KWH						2.6
Balance						1.5
Minimum Bill	$8.00	$3.10	$7.00	$3.30	$3.50	$3.00

Note: 1. For a two monthly bill
2. For a monthly bill

* These figures reflect the gross rate before the 10 percent discount for prompt payment.

TABLE 6

COMPARISON OF SMALL COMMERCIAL & COMMERCIAL RATES

Demand	(1) North York	(2) East York	(2) Scarborough	(1) York	(2)* Toronto	(2) Etobicoke
0 - 50 KW	0	General Service Rate applicable to both commercial and industrial consumers				
Greater than 50KW	$2.50/KW					
Minimum Bill to 50KW	$4.00					
Minimum Bill over 50KW	$0.25/KW					
Energy						
1st 50 KWH	5.2¢/KWH					
Next 200 KWH	2.35¢/KWH					
Next 9,750 KWH	1.96¢/KWH					
Next 1,999,000 KWH	0.88¢/KWH					
Balance	0.50¢/KWH					
Small Commercial (bi-monthly billing)						
1st 100 KWH		4.7¢/KWH	5.3¢/KWH			
Next 400 KWH		2.0¢/KWH	2.1¢/KWH			
Balance		1.4¢/KWH	1.55¢/KWH			
Minimum Bill		$3.10	$7.00			
Commercial (monthly billing)						
Demand		$0.50/KW	$0.50/KW		$1.48/KW	$0.50/KW
1st 100 hours of demand		2.95¢/KWH	2.90¢/KWH		3.36¢/KWH	2.95¢/KWH
Next 100 hours of demand		1.2 ¢/KWH	1.3 ¢/KWH		1.45¢/KWH	1.00¢/KWH
Balance		0.72¢/KWH	0.72¢/KWH		0.75¢/KWH	0.65¢/KWH
Minimum Bill		$4.00	$3.50		$3.50	

* These figures reflect the gross rate before the 10 percent discount for prompt payment.

TABLE 6 (cont'd.)

COMPARISON OF SMALL COMMERCIAL & COMMERCIAL RATES

Demand	North York (1)	East York (2)	Scarborough (2)	York (1)	Toronto (2)	Etobicoke (2)
0 - 25 KW				(0		
Next 25 KW				($0.60/KW		
Balance			General Service Rate	($2.45/KW		
			applicable to both	(		
Energy			commercial and industrial	(		
			consumers	(		
1st 50 KWH				(4.4 ¢/KWH		
Next 200 KWH				(2.6 ¢/KWH		
Next 4,750 KWH				(2.0 ¢/KWH		
Next 5,000 KWH				(1.7 ¢/KWH		
Balance				(0.8 ¢/KWH		

Note: 1. North York Hydro and York Hydro apply the rates shown (general service rates) to both commercial and industrial consumers.

2. East York, Scarborough, Toronto and Etobicoke Hydros have a separate rate (not shown) for industrial consumers.

would charge industrial customers in accordance with the rate structures shown in Table 7. The charges for large users would be as shown in Table 8.

10. Summary

The quality of service provided by the six municipal electric utilities serving the Metropolitan Toronto Region is of a high standard comparable to that of any major city in the world. While it is unlikely that this standard will deteriorate due to failure on the part of the municipal electrics, the problems confronting Ontario Hydro may lead over the long term to a lowering of the existing high level of reliability. These problems relate primarily to possible delays in the installation of new generating and transmission facilities and are attributable to the need of Ontario Hydro to satisfy the requirements of public interest and environmental groups. This particular issue of reliability is complex and in some respects beyond the terms of reference of this study. Nevertheless, it is evident that the reliability of the service provided by the municipal electrics is a direct reflection of the overall reliability of the Ontario Hydro system.

A second fundamental issue to consider is that of amalgamation of the six municipal electric utilities under one regional authority. The most immediate benefits of such a step would be the introduction of a uniform system of rates for electrical service, a centralized administration and standard design and operating practices. However, as the rates presently charged are based on the actual cost of power, a uniform system implies cross-subsidization between boroughs. Also, as previously mentioned, the benefits to be derived from a technical standardization would not accrue immediately, it being uneconomical to replace equipment and facilities prior to the expiry of their useful life.

One rather intangible advantage of the present arrangement is the element of competitiveness that exists between all of the municipal electrics. Each utility is very aware of the performance of the others and strives to ensure that no major disparities develop. This attitude is not limited to the Metropolitan Toronto electric systems but tends to prevail throughout the province.

TABLE 7

COMPARISON OF INDUSTRIAL RATES

	Toronto*	Etobicoke	East York	Scarborough
Demand				
Per KW of Billing Demand	$1.48	$1.00	$1.00	$1.00
Energy				
1st 100 hours use of demand	2.98¢/KWH	2.45¢/KWH	2.27¢/KWH	2.40¢/KWH
next 100 hours use of demand	1.05¢/KWH	0.85¢/KWH	1.0 ¢/KWH	1.10¢/KWH
Balance of monthly consumption	0.65¢/KWH	0.65¢/KWH	0.72¢/KWH	0.70¢/KWH
Minimum Bill	$3.50	-	$4.00	-

* These figures reflect the gross rate before the 10 percent discount for prompt payment.

TABLE 8

LARGE USER RATES

(Greater than 5000KW Demand)

	Demand	Energy
Scarborough	$3.80/KW	0.5¢/KWH
York	$3.70/KW	0.5¢/KWH
East York))	no large user rate	
Toronto)		
Etobicoke	$3.80/KW	0.5¢/KWH
North York	$3.95/KW	0.5¢/KWH

Mention has already been made of the question of elected versus appointed representatives at the Commissioner level. At the management level five of the municipal electrics are organized as independent commissions where authority and responsibility are well defined. The exception is the York Hydro System which operates as a department of the municipal corporation with some of its officers having additional duties outside the Hydro Electric System.

The allocation between Ontario Hydro and the municipal electrics of the cost of facilities does not appear to be a major issue within the Metropolitan Region although it is a contentious matter elsewhere in the province. Ontario Hydro is currently engaged in a major study of the cost allocation problem. However, the results are not likely to have a significant impact on the Metropolitan Toronto situation.

The differing policies regarding the financing of system expansion is a subject worthy of further consideration. The advocates of debt financing claim that it is unfair to burden present day consumers with the cost of facilities that may have a useful service life in excess of 30 years. A more reasonable approach would be to spread the cost of system expansion over present and future users. The proponents of revenue financing would argue that the servicing of debt adds an unnecessary cost increment to the overall cost of power. As a consequence, the consumer is paying more than would be the case if capital expansion were funded out of revenue. Both positions have merit although it would appear that most of the Metropolitan Toronto electric utilities favour the current revenue alternative.

Finally it is appropriate to point out the peculiar responsibilities of the Scarborough Public Utilities Commission in respect to water supply and distribution in that Borough and of the Toronto Hydro Electric System in regard to district heating. Although both provide excellent levels of service in these areas, any integration of electrical utility responsibility at the Metropolitan area would have to take this into consideration.

SECTION E(2) - ENERGY SUPPLY - FOSSIL FUELS

1. GENERAL

1.1 Introduction

Petroleum, natural gas, and coal are fossil fuels formed millions of years ago from living matter. Their combustible components are hydrogen and carbon. They also contain various impurities, the most troublesome being sulphur, a major source of air pollution and corrosion.

Most of the sulphur is removed from natural gas before transmission to Ontario. Sulphur is removed from petroleum at the refinery, but refined petroleum products contain various amounts of sulphur, depending upon the source of the crude oil and the petroleum products. In general the lighter products, naphtha, gasoline and distillate fuel oil have less sulphur than the heavy residual fuel oils. Low sulphur fuel oils are more expensive than high sulphur oils. Western North American coals contain less sulphur than eastern coals. Thus, in Ontario, transportation costs increase the price of low sulphur coal. There are, as yet, no successful methods for economically removing sulphur from coal.

Petroleum and coal contain other impurities that add to the problems of burning them cleanly and without excessive equipment maintenance. The most common and troublesome impurities are heavy metals, and, in the case of coal, slate and ash.

All fossil fuels have one thing in common: they cannot be replenished.

1.2 Fossil Fuel Uses in Metropolitan Toronto

Of all the fuel consumed in Metropolitan Toronto for heating buildings and for industrial process heating, roughly half is natural gas and half is petroleum. The balance of the heating energy, about two percent is supplied by coal and electricity. Petroleum supplies virtually all of the energy required for transportation. Subways, streetcars, and trolley buses are powered by electric motors, but almost all other powered vehicles operating in Metro consume petroleum.

1.3 Fossil Fuel Trends in Metropolitan Toronto

The only fossil fuel for which reliable Metropolitan Toronto statistics are available is natural gas. Its consumption has increased fourfold from 1965 to 1974. The increase is expected to be between five and ten percent per year within the next five years unless supplies from western Canada are restricted, as discussed further in this Report.

Much of the increase in natural gas consumption has been, and continues to be, at the expense of petroleum and coal. There is little undeveloped land within Metropolitan Toronto. Consequently the construction of large high rise apartment buildings, particularly in the City of Toronto, requires the demolition of a number of older small residences. The latter are generally heated by oil and the new apartments by gas.

Within the past five years Eaton's main store heating plant which was coal-fired was replaced by district heating which is 85% gas-fired and 15% oil-fired, and the old coal-fired General Hospital heating plant was replaced by the much larger Toronto Hospital Heating Plant which is 95% gas-fired and 5% oil-fired. Each of these plants heated 2.5 million square feet of floor space. St. Michael's Hospital will be converted from coal to district heating this year, another gain for gas.

The trend toward natural gas is a result of two primary factors: lower capital cost of gas-fired heating apparatus and lower air pollution than with any other fossil fuel. A third factor has been added recently: a widening cost difference between gas and oil. Ten years ago residential gas averaged $1.00 per million BTU (British thermal units) and domestic fuel oil cost 18.1¢ per gallon or $1.13 per million BTU. As of March, 1975 the comparative costs per million BTU are $1.51 for gas and $2.29 (36.6¢ per gallon) for domestic fuel oil.

1.4 Fossil Fuel Substitutes

The municipal waste generated in Metropolitan Toronto could be utilized as a low sulphur fuel to replace about five percent of the fossil fuels used for

stationary heat generation. To make use of this fossil fuel substitute, the heat must be generated in one or more large central plants and distributed in underground piping as steam or hot water.

2. NATURAL GAS

2.1 General

Natural gas is distributed throughout Metropolitan Toronto by the Consumers' Gas Company. The company was founded in 1848, primarily to supply street lighting in the City of Toronto. For more than a century the company supplied manufactured gas produced primarily from coal. Approximately twenty years ago the change was made to natural gas and since that time the company's growth has been rapid.

2.2 Legislation

The Consumers' Gas Company was incorporated under the laws of the Province of Canada on March 23, 1848 and has continued as if incorporated under the laws of the Province of Ontario.

The company operates under the Ontario Energy Board Act. The Energy Board regulates earnings, sets rates, and enforces the safety regulations under which distribution systems and gas-fired appliances are installed.

The franchise under which the company distributes natural gas in Metropolitan Toronto will be open for renewal in 1977.

2.3 Organization

The company's affairs are managed by 28 directors and senior officers. The board of directors numbers 18. Three of the 13 senior officers, - the Chairman of the Board, the President, and the Executive Vice-President, serve on the board of directors. The total staff is 2,703.

The common shares of the company are 97% Canadian-owned and are listed on the Toronto and Montreal Stock Exchanges.

2.4 Financial

The physical assets were valued at $511 million in 1974. The 1972 value of $429 million was used by the Ontario Energy Board to determine the rate base at public hearings in 1973-74, and to set 9.35% as the return on the rate base and 14% as the current return on equity.

The company's total revenue and expenses for 1974 were $283 million and $253 million respectively. Major capital expenditures are financed from retained earnings plus borrowing plus equity. The present ratio is one-third from revenue and two-thirds from loans. The present long term debt is $362 million.

Copies of the company's annual financial statements are readily available.

2.5 Source of Supply

Approximately 99% of the natural gas is obtained from TransCanada Pipelines, whose sources are western Canadian producers. The balance is obtained from off-shore wells in Lake Erie.

2.6 Service Area

The Consumers' Gas Company's distribution is concentrated in five areas:

Niagara Peninsula
Central Ontario - which includes Metropolitan Toronto
Eastern Ontario
Western Quebec
Northern New York

Seventy-nine percent of the Metropolitan Toronto area is serviced by the company's distribution system. Distribution is by a network of piping laid beneath the city streets, with pressure regulating stations throughout the area.

2.7 Gas Sales in Metropolitan Toronto

Customers are classified as Residential, Industrial, and Commercial. Statistics for 1974 are as follows:

Classification	Number of Customers	Annual Sales MCF*
Residential	226,411	32,153,674.1
Commercial	19,784	49,328,945.3
Industrial	4,451	40,246,320.5
Totals	250,646	121,728,939.9

* thousands of cubic feet

The natural gas consumed by the R.L. Hearn Generating Station is not included in the above figures. This gas is supplied by a separate pipeline independent of the system which distributes gas to the quarter million customers in Metropolitan Toronto.

Natural gas is used for heating buildings, heating domestic hot water, cooking, clothes drying, air-conditioning, heating swimming pools, industrial process heating, commercial baking, and numerous other stationary uses. Its use as a transportation fuel is negligible.

2.8 Rates

As of April 1, 1975 the company purchases gas from TransCanada Pipelines at 81.5¢ per MCF. A hearing will begin on April 29, 1975, before the National Energy Board to consider an application by TransCanada for a further 16¢ per MCF increase. In November 1975 the field price of natural gas will be increased by approximately 15¢ per MCF, by which time the price to Consumers' Gas could be as high as $1.285 per MCF.

The company sells gas to its customers at rates regulated by the Ontario Energy Board. There are nine residential rates and five commercial/industrial rates. The company has applied to the Board for a reduction in the number of rate structures and an increase in the rates to offset the increased cost of gas to the company and provide an equitable return.

The rates for large users are negotiated between the company and the customer within limits set by the Board. The rates for residential and small commercial/industrial users are not subject to negotiation.

The rates vary, depending on the use of the gas, whether for building heating, domestic hot water heating, gas-fired appliances such as cooking stoves, refrigerators and clothes dryers, air-conditioning, swimming pool heating, or industrial process heating. The rates also vary in accordance with the number of uses made of the gas by the customer.

The rates in effect since October 1, 1974 result in the following average costs per MCF to the customer:

Residential heating only	$1.51
Residential heating plus three other uses	$1.36
Commercial and Industrial space heating, plus other uses	$1.42

A further important distinction is between "firm" and "interruptible" gas. The former term refers to gas which the company guarantees to supply to the customer at all times throughout the period of the contract. Contracts are generally made for a minimum period of one year. The latter term refers to gas which the company supplies to customers who have equipment capable of burning an alternate fuel, usually oil, but occasionally propane or butane. While contracts were, until recently, negotiated commonly for periods of five years, inflationary and sometimes unpredictable price trends are currently limiting most contracts to a period of one year.

With an interruptible contract, the length of the curtailment period (the time during which the gas may be replaced by an alternate fuel) will be negotiated together with the fuel price. Generally, the longer the curtailment period, the lower the price paid for the gas. Curtailment takes place during the winter months when gas may be in short supply, because of high heating demands. When a change in fuel is necessary the gas supplier notifies the customer in advance. The actual curtailment period may be equal to or shorter than the contracted curtailment period, depending generally upon the severity of the winter.

2.9 Security of Supply

Several factors limit the supply of natural gas to Ontario and consequently to Metropolitan Toronto. The total quantities of gas available are limited by the production capacities of the western Canadian gas

wells and treatment plants, and by negotiations between the federal and provincial governments. Consumers' Gas believe that the gas volumes presently contracted for under long term contracts with TransCanada Pipelines Limited will be sufficient for the 1975-76 season.

The maximum rate of gas flow to the customer is limited by the capacity of the pipelines which transport the gas from the gas fields to the distribution systems. This maximum rate is augmented by underground storage facilities near Sarnia and in the Niagara Peninsula. While the pipeline supply remains essentially steady at 25 billion cubic feet (BCF) per month, the Consumers' Gas customers consume as little as 15 BCF per month between April and November. During this time the excess gas is compressed and stored. During the period from November to April, when gas consumption exceeds the pipeline supply, gas is released from storage and the peak monthly sendout to the customers reaches almost 35 BCF.

Until natural gas supplies become available from the Mackenzie Delta and Alaska, gas consumption in Metro will probably have to be limited to the 1975-76 levels. This restriction is expected to continue until 1980. After 1980, consumption of natural gas can be expanded to meet any foreseen market provided that the pipeline to bring gas from the Arctic is completed by that time.

Accidental interruption of natural supplies to customers within Metropolitan Toronto is virtually non-existent. By the nature of the underground distribution piping customers are connected to loop systems which will insure continuity of supply while a main is under repair. Should a failure occur in the transmission pipeline the underground storage can maintain the gas supply while repairs are made. In addition, there is sufficient redundancy in compressor stations and pressure regulating stations to insure a continuous gas supply in the event of equipment breakdown.

2.10 Service Policy

The company's policy with respect to guaranteeing supplies of gas to its customers is that residential customers are given the highest priority, followed in order by commercial and industrial firm gas customers, with the lowest priority being given to interruptible customers who have an alternate fuel.

Should gas be in short supply, as may be the case until Arctic gas is made available in Ontario, the company will continue to supply the firm gas customers, but will reduce the supply of gas to the interruptible customers.

The company's policy with respect to extension of its distribution system into areas that are not presently serviced is an economic one. Essentially if studies show that an area can be serviced economically the distribution system will be extended into that area.

In addition to supplying natural gas in Metropolitan Toronto, the company provides emergency service and advice to its customers, and arranges for the sale and installation of gas-fired appliances by independent contractors.

3. PETROLEUM

3.1 General

Petroleum products are marketed throughout Metropolitan Toronto by several hundred retail outlets which obtain their products from seven major producers. The two main classifications of petroleum products that are used for the production of energy are heating fuels and transportation fuels.

3.2 Legislation

The distribution of petroleum fuels in Metropolitan Toronto is regulated by the Ontario Gasoline Handling Act, the Ontario Energy Act, and the Ontario Energy Board Act. These provincial regulations apply to bulk storage facilities, retail outlets, transportation of fuels and customers' fuel storage and combustion equipment. They prescribe the conditions of agreements between distributors and consumers, register and inspect contractors and installers, and enforce safety standards.

The provincial regulations take precedence over all municipal by-laws.

3.3 Organization

The majority of the large petroleum corporations in Canada are subsidiaries of multi-national companies which engage in exploration, well drilling, refining, transportation by sea and land, and marketing of petroleum products. These corporations also own and operate natural gas production facilities, usually in conjunction with their oil wells.

Refined petroleum products are distributed to the customer by company-owned retail outlets, and by independent fuel dealers.

3.4 Sources of Supply

Petroleum fuels sold in Metropolitan Toronto are obtained from refineries located west of the city in Clarkson, Corunna, Oakville, Port Credit and Sarnia. These refineries obtain their crude oil from wells in Alberta, Manitoba, Saskatchewan, and, to a very much smaller extent, Ontario.

3.5 Sarnia Area

The products from the Ontario refineries are distributed throughout Ontario with the exception of the Eastern Ontario Triangle. The latter area is supplied from Montreal refineries which obtain their crude oil from Venezuela and the Middle East.

The sales regions of the various petroleum companies do not coincide with municipal or other political boundaries. Individual retailers are not restricted in their operations. For example, a Scarborough heating fuel dealer may supply oil to buildings in North York or in rural areas outside the Metropolitan boundaries.

Similarly, a resident of North York may buy fuel for his automobile in Milliken but consume most of it within the City of Toronto. These examples illustrate some of the reasons why exact petroleum consumption figures are not available for Metropolitan Toronto.

3.6 Distribution

Heating and transportation fuels are piped by underground product pipelines to bulk storage terminals

inside and adjacent to Metro and transported by tank trucks to retail dealers.

All retail transportation fuel outlets have their own storage facilities. These are in most cases underground tanks. Space restrictions in urban areas usually do not permit the construction of above-ground fuel tanks while complying with municipal by-laws and provincial legislation.

Retail heating fuel dealers may have their own storage tanks, again generally underground, or they may obtain their fuel directly by tank truck from the refinery or bulk terminal.

Transportation and heating fuels are delivered to the retail dealers in tractor-trailer and truck-trailer vehicles carrying up to 10,000 gallons. These large vehicles are also used to deliver heating fuels directly to major consumers. Some of these large oil-fired industrial and central heating plants require as many as fifteen deliveries per day.

Most heating fuel is delivered to the customers in 2,500 gallon tank trucks. A typical single family house has a 200 gallon tank in the basement and will require about 1,000 gallons of oil each year. Larger buildings have tanks of sufficient size to contain one or more full truckloads at a time. Such tanks are either buried outside the building or enclosed in a fire-resistant vault in the building basement.

3.7 Transportation Fuels

There is a wide variety of petroleum transportation fuels ranging from aviation jet fuels, through aviation gasoline, automotive gasoline and diesel oil to marine bunker oil. All of these fuels have an impact on Metropolitan Toronto.

There are two active airports within the Metropolitan boundaries. The Island Airport is used by small aircraft, most of which burn gasoline. Downsview is a military base used by aircraft that burn both jet fuel and gasoline.

The railways operating within Metro utilize diesel locomotives that burn diesel oil.

Ships that use Toronto harbour consume marine diesel and bunker oils. These ships are fueled in countries all over the world with oils of various sulphur content. Small pleasure boats that abound along the lakefront for the most part burn automotive gasoline. A few of the larger pleasure craft as well as working craft such as tugs and ferries use diesel oil.

Automotive gasoline and diesel fuels have a more direct and obvious impact on Metropolitan Toronto than the aviation, railway and marine fuels. These fuels are marketed for the most part by the familiar service station.

Large fleet owners have their own storage tanks and buy in bulk. Typical of such customers are city and inter-city buses, construction companies and truck transport lines.

Although, as previously noted, statistics are not kept for Metropolitan Toronto, rough estimates may be based on the figures published by the Ontario Ministry of Energy and the National Energy Board for the Province of Ontario. Transportation accounts for 55 percent of the petroleum consumed in Ontario. Road vehicles use 85 percent of all transportation fuel. For Toronto the annual consumption is about twenty million barrels, of which 98 percent is gasoline and 2 percent diesel oil. For comparison, twenty million barrels of gasoline and diesel oil is equivalent to 90 percent of the natural gas consumed in Metro annually.

3.8 Heating Fuels

There are two broad classes of heating fuels: distillates, otherwise known as light fuel oils, and residuals, also called heavy fuel oils. Fuel oils are also classified by number, as numbers 1, 2, 4, 5 and 6. No. 1 is a distillate oil known also as stove oil or kerosene and is not used to any great extent in Metro. No. 2 is also a distillate oil known as light or domestic fuel oil. It accounts for more than half of all the fuel oil consumed and most of it is used to heat homes and small commercial buildings. No. 4 oil falls midway between the distillate and residual oil classifications. It is used in medium-sized buildings. Nos. 5 and 6 are heavy residual oils, sometimes called bunker B and bunker C because they are first used to fire marine boilers and were stored in the ships' fuel bunkers.

The higher numbered oils weigh more per gallon, are more viscous, contain more BTU's (heat energy) per gallon, and cost less per gallon than the lower numbered oils. Heavy oils require preheating before they can be ignited. The heaviest must be heated before they will flow through pipes and must be transported hot. Large-sized relatively complicated combustion equipment must be employed with heavy oils; consequently their use is confined to large buildings and industries.

The heavy residual oils normally have higher sulphur contents than the light distillate oils. In order that residual oils may be burned within the provincial air pollution regulations, low sulphur residuals are available at higher cost. Heavy oils are extensively used as alternate fuels in dual fuel installations fired with interruptible natural gas.

There are four types of retail heating fuel outlets: company owned facilities staffed by company employees, agencies, distributors, and private brand distributors. Agencies are paid commissions to deliver the products of one oil company to the customer and obtain the fuels from the oil company bulk storage facilities. Distributors buy their fuels from an oil company and sell to their customers using trucks identified by the oil company trademark and colour scheme. Private brand distributors may have their own storage tanks or may fill their tanks at the refinery or bulk plant. Their delivery trucks bear their own company names and trademarks. Many of these distributors are long-established fuel dealers who survived the transition from coal, coke and wood to liquid fuels.

The oil companies estimate that, in 1970, 48 per cent of the homes in Metropolitan Toronto, some 236,000 were heated by oil. This represented about 236 million gallons of number 2 oil annually. Sixty-nine percent of the total fuel oil sold in Metro in 1970 was sold by seven major oil companies.

3.9 Rates

The price of Canadian crude oil is related to world oil prices and is set by the federal and provincial governments. The strongest influences on oil price are decisions made by the Arabian OPEC nations.

Retail prices of transportation and heating fuels vary throughout the oil industry. The wholesale price of gasoline has a variation of about 0.3¢ per gallon. Large fleet operators buy their fuel by annual tender, but the majority of motor vehicle owners buy at retail outlets where the price may vary by as much as 10¢ per gallon.

Householders pay the oil company posted price for heating oil (36.6¢ per gallon of number 2 oil at March 1975). Larger consumers tender for their yearly fuel supplies and receive discounts from the posted price.

3.10 Security of Supply

The security of the supply of petroleum fuels is an international problem, highly dependent upon the crude oil import situation. Canada could be self-sufficient in oil if Arctic oil fields and the Alberta tar sands are developed together with the necessary pipelines to transport these fuels to eastern Canada. In summary, the overall fuel oil situation is similar to the natural gas situation previously described.

Concerning Metropolitan Toronto, security of supply to the individual customer is assured by the multiplicity of fuel dealers, tanker trucks, bulk storage depots and refineries within or adjacent to Metro. Should an individual dealer run short of heating fuel, other dealers would assist him so that his customers would not suffer.

3.11 Service Policy

Because the petroleum industry is a competitive one, individual dealers must vie with one another for customers. Unsatisfied customers are free to change suppliers.

There is at present an oversupply of fuel oils because of a slowdown in the economy and effective conservation practices. So far there has been no need to restrict the sale of fuels or to set priorities.

3.12 Trends in Metropolitan Toronto

Residential heating oil sales are decreasing by 0.2% per year. Commercial heating oil sales are increasing by 2% per year.

There is a major shift from heavy residual oils to number 2 oil. This trend is a result of provincial air pollution legislation, necessitating the burning of low sulphur distillate oils to reduce sulphur dioxide emissions from large heating and industrial plants.

Successful energy conservation practices during the past heating season are, in the oil industry's estimation, responsible for a three per cent reduction in annual heating fuel sales over the previous year.

No trend has developed toward underground pipeline distribution of fuel oil to individual homes in Metro from large central storage tanks. There are two such systems in Markham and one in Thornhill.

4. COAL

4.1 General

The use of coal as a fuel for transportation, and for residential and commercial heating declined rapidly in the third quarter of this century. Today about half the coal consumed in Ontario is used to produce electricity in thermal generating stations and most of the balance is consumed by heavy industry, principally steel making. The distribution of coal is thus confined to a few very large consumers.

Coal production and consumption statistics for the province as a whole are published by the Ontario Ministry of Energy, and by the National Energy Board. Statistics for areas smaller than the province are not available. However, within Metropolitan Toronto, apart from its use as a supplementary fuel at the R.L. Hearn Generating Station of Ontario Hydro, coal is today an insignificant factor in urban energy supply.

4.2 Problems

The transportation, storage, handling and combustion of coal, as well as disposal of the resulting ash produce air pollution and noise, and require a large amount of labour in comparison to oil and gas. Effective air pollution control equipment can be installed only in very large plants.

A return to coal would increase the cost of heating. Practically all of the coal presently consumed in Ontario is American bituminous. A large scale increase in the use of coal for heating buildings in Metro would require American anthracite coal for small buildings and western Canadian bituminous for large buildings and industrial plants. Bituminous coal, which is available in Canada, cannot be burned successfully in small furnaces, particularly with hand firing. Anthracite coal, which can be burned with minimum smoke in small furnaces is obtained from the eastern United States. The high cost of transportation and the high labour content associated with coal production make coal a more expensive fuel for general use than either oil or gas.

A complete return to coal heating would add about one million tons of ashes to Metro's annual municipal refuse collection.

4.3 Future Trends

There are large reserves of coal in Canada and the United States. Utilization of this coal in thermal generating stations, large industrial boiler plants, and large district heating plants could insure an adequate supply of more desirable fuels - natural gas and distillate oil - for residential and commercial building heating.

The Federal Government has begun investigations into the conversion to coal firing of many of its large gas and oil fired heating plants. Most of these plants were originally coal fired. This trend will probably spread. In order to prevent an increase in air pollution it will be desirable to confine the increased use of coal to district heating plants and other large installations.

5. IMPLICATIONS FOR METROPOLITAN TORONTO

Government legislation and policies relating to fossil fuels are national and provincial, rather than municipal. They deal with resource conservation, pollution of the environment, safety, health, and working conditions. Federal and provincial governments also derive income in the form of royalties and taxes levied against fossil fuels, and are directly involved in the development of Canadian oil and gas.

SECTION F - AIR QUALITY CONTROL

1. General

Prior to the enactment of the Air Pollution Control Act passed in 1967, air pollution matters came under the jurisdiction of municipalities in Ontario. The legislature transferred air pollution responsibilities to the Provincial Government, consequently air quality and its control in Metropolitan Toronto is now administered by the Ontario Government through the Ministry of Environment.

This system has produced significant improvements but does not include any overall planning mechanism for air pollution control. Powers of the Province are frequently advisory only at the planning stage; municipalities have no legal requirement to accept advice from the Province in relation to air pollution control in the approval of rezoning.

Before discussing issues which arise in the present circumstances, it is appropriate to review the ways in which both the Provincial and Federal Governments carry out their mandates in the air management field. From this review, the effect of provincial and federal decisions on Metro may be assessed.

2. Legislation

The Environment Protection Act 1971, defines the provincial jurisdiction and responsibilities in matters of air quality and its control. Regulations are made and revised under the Act from time to time for specific and for province wide application. As an example a specific regulation - Ontario Regulation 374/70 governs the sulphur content of fuels within the Municipality of Metropolitan Toronto, whereas the recently enacted regulations 872/74 and 873/74 governing ambient air quality and permissible contaminant concentrations apply throughout Ontario.

Bill C-224 passed by the House of Commons on June 21, 1971 created the Clean Air Act. On federal undertakings and activities, this Act empowers the Environment Canada to make a variety of regulations relating to environmental management which in some cases might affect resources owned by other governments.

3. Administration of Air Pollution

(a) Province

The administrative and technical capacity available in the Ministry is more comprehensive and sophisticated than that found in any other air pollution jurisdiction in Canada.

Within the Ministry of the Environment there are two divisions which administer most of the matters relating to air pollution. These are Environmental Assessment and Planning (including Environmental Approvals) and Field Operations.

Environmental Assessment and Planning

Environmental Assessment and Planning has within the division an Air Resources Branch which acts as a services unit in supplying information and expertise where required throughout the Ministry. This includes technical services relating to vehicle emissions, meteorology and air quality, phytotoxicology, criteria development and program planning and technical development and appraisal. The vehicle emissions group deals with setting of standards, monitoring of vehicle emissions and liaison activities with other government agencies.

The meteorology and air quality group provides meteorological expertise and advice and administers the Air Quality Index in Metro. The Index is measured at four locations throughout Metro and the highest reading is reported on an hourly basis. This group also assists Field Operations and the Approvals Branch in predicting air pollution using a variety of models. Some models have a legal basis and are written into the regulations while other models are used for planning purposes.

The Environmental Approvals Branch of the Environmental Assessment and Planning Division is responsible for environmental approvals including air quality aspects for all new large projects in the Province. Smaller projects may be approved at the regional level in the appropriate Field Operations Region. The Branch has a land use co-ordination and special study section which reviews on a referral basis a variety of proposals made under The Planning Act, which are referred for approval by the Ministries of Housing and Treasury, Economics and Intergovernmental Affairs. These proposals cover matters such as subdivision plans, condominium plans and zoning. Through this referral mechanism, the Ministry of the Environment can influence decisions affecting zoning and new construction. The Approvals Branch provides planning advice to any new undertaking so that adverse effects will be avoided. This advice is not necessarily heeded and once a decision to proceed with a development receives municipal approval, it is difficult to effect any change on air management grounds.

Field Operations - Central Region

Central Region enforces air pollution control within Metro. Within the Central Region Organization there is a Toronto District Office that handles municipal and private abatement. Industrial abatement of air pollution is handled through a Toronto East and a Toronto West District Office. As part of the technical support activity, air quality is monitored and assessed in Metro. Simple approvals are handled by the region, whereas more complex ones are forwarded to the Approvals Branch.

There is little contact between the municipalities in the Municipality of Metropolitan Toronto and the Ministry of the Environment regarding air quality. The Ministry monitors air quality throughout of the area municipalities and has a total of approximately forty-six continuous monitors that measure sulphur dioxide, the coefficient of haze, oxidants, oxide, carbonmonoxide and hydrocarbons. The locations of the monitors are shown on Figure 4, which appears at the end of this report. In addition, there are numerous discrete sampling monitors that measure particulates, heavy metals,

trace substances and long term trends in sulphur dioxide and floride emissions.

When informed by the Air Resources Branch that air quality is unacceptable and likely to remain unacceptable for more than a very brief time, regional staff are empowered to:

(i) request curtailment of emissions when the Air Quality Index reading is between 32 and 49;

(ii) order emission curtailment when the Index reading is 50 or more.

The Central Region staff participate in ad hoc committee activities that are set up from time to time to handle matters such as lead and asbestos emissions. They participated in the committee that recently established emission standards for eighty-four new materials and review new and revised standards. Through such committees, knowledge and responsibilities are transferred between the Branches of the Ministry. There does not appear to be any input to these committees from the municipalities unless public hearings are convened.

(b) Federal

Environmental Protection Service

Environmental Protection Service (EPS) is the arm of the Environment Canada that has responsibility for federal facilities and projects sponsored by the federal government. The Director for the Ontario Region is responsible for federal activities such as new dredging, harbour facilities, Harbour Commission, the Toronto International Airport and federally sponsored experiments such as recycling programmes. Indirect federal effects on air quality are exerted through legislation such as that governing lead in gasoline.

The EPS of Ottawa has established an organization called the Federal Activities Protection Branch (FAPB) to co-ordinate pollution control for federal facilities and federal undertakings. Experts within the department evaluate consequences of air emissions and recommend measures so that federal and provincial standards are not exceeded. Liaison in such matters is maintained with the Ontario Region of EPS.

Because of the involvement of the National Energy Board in the export of electrical power to the United States, EPS is becoming involved in all aspects of pollution resulting from the generation of electrical power, and as a result is extending its jurisdiction into the Metro operations of Ontario Hydro.

With regard to railways, the Canada Railway Act, administered by the Canadian Transport Commission, gives enforcement of air pollution matters to the Province of Ontario. Therefore, air pollution generated by railways in Metro is the responsibility of the provincial Ministry of the Environment. Similarly, air pollution regulations relating to shipping governed by the Canada Shipping Act are enforced by the provincial Ministry of the Environment. Emissions from automobiles are within the jurisdiction of the Province, however the Federal Government is responsible for establishing limits for auto emissions from new vehicles.

4. Implications for Metro

While the present mechanism of air quality monitoring and air pollution control is effective with regard to existing sources, there are some potential problem areas which relate to the planning of new facilities:

(a) Air quality is not included as a parameter in assessing potential land useage, provided a development is permitted by existing zoning. Consequently, a development which requires high air quality may be approved in a location immediately downwind of a facility which produces substantial emissions. Although the facility may have been in compliance, the development creates a new point of effect where air quality is unacceptable. In order to alleviate this problem and return within the Ministry's design standard for impingement, the emitting facility must undertake pollution control measures to reduce emissions.

This problem can be viewed two ways:

(i) The owner of the land has a right to air of an acceptable quality on his land and around structures on that land. If the owner builds a new structure which intercepts an unacceptable impingement, the source or sources of the emissions causing the problem should be required to correct the situation.

(ii) The owner of the source of emissions is in compliance with the Ministry's standards provided the development does not occur. In many cases the cost of compliance has been substantial, therefore, development should be restricted such that this compliance is maintained, or the developer should share or assume the cost of additional improvements.

This potential conflict can arise within a single area municipality. An additional complication arises where a development is approved in one municipality and is subsequently affected by a facility outside the municipality which was previously in compliance with the regulations.

(b) This situation can be further extended to a facility outside Metro affecting new developments within the Metropolitan area.

The Ministry of the Environment have shown that air pollutant emissions from developed areas along Lake Ontario and as far away as Hamilton and Buffalo can under certain circumstances have a measurable effect on Toronto air quality. Unless a mechanism is created through which Metro or the Province can influence developments external to Metro boundaries, this potential for air quality deterioration will exist.

(c) The relatively limited influence of Metro Government on transportation and transportation policies creates a further air quality concern. The very substantial reductions in emissions from industrial and commercial air emissions over the past ten years has increased the proportional effect

of air emissions from automobiles, trucks, aircraft and other mobile sources. Although federal and provincial criteria have reduced emissions per vehicle, increases in vehicle numbers and useage have counterbalanced part of this improvement. Recent Ministry of the Environment emission inventories suggest that future air quality improvement policies should stress mobile source emissions. As a consequence, unless local or regional government has a stronger voice in transportation control, attempts to reduce such emissions may be frustrated and ineffectual.

SECTION G - NOISE ABATEMENT

1. General

Within Metro responsibility for noise rests with the individual area municipalities and there is no overall co-ordination at the Metro level. Each area municipality has a by-law which covers noise to some extent. Some are purely descriptive and provide for regulating noise as a nuisance; others tend to cover a type of noise source and hours of operation of construction equipment.

Recently the City of Toronto enacted a new by-law subsequent to a detailed study of noise measurements and of the public reaction to noise. The new by-law coverage includes certain vehicular noises (horns, noises caused by lack of repair, loading and unloading), construction site noises, birds, animals, loud speakers, lawn mowers, air-conditioners and other equipment.

A number of sources which generate noise within Metro are outside the control of the municipalities. Typical of these are provincial highways, railways and aircraft.

2. Legislation

(a) Municipal

Most municipalities have enacted by-laws relating to noise under the provisions of the Municipal Act.

The most significant by-law is the City of Toronto by-law number 44-75 passed this year.

(b) Provincial

Noise is one of the pollutants controlled through the Environmental Protection Act, 1971.

The Ministry of the Environment has recently prepared a model by-law and passed legislation under The Environmental Protection Act enabling municipalities to adopt all or part of the Ministry's recommended standards. The by-law

sets out a comprehensive control program for most noise sources at the local government level. The by-law is currently being reviewed by municipalities throughout the Province and is expected to be available shortly.

(c) Federal

Since the Federal Government has jurisdiction over new motor vehicles and railway operations, the noise aspects of vehicles and railways are a federal responsibility. Federal noise legislation for these sources is contained in the Motor Vehicle Safety Act and the Canada Railway Act.

3. Administration of Noise Control

Amongst the area municipalities, the City of Toronto is the only one which has taken a sophisticated approach to noise. As a follow-up to preparing its new by-law, its has also assigned personnel to monitor and enforce its provisions, and those of The Environmental Protection Act.

At the provincial level the Ministry of the Environment is attempting to create a greater understanding and awareness of noise pollution across the Province. While most of the provisions of its model by-law will be subject to modification to suit local conditions, the Ministry intends to adopt uniform noise levels throughout the Province. In this context the uniformity relates to the sound level at a person's ear as opposed to the sound level at the source of the noise. In this regard, if a relatively noisy source has sufficient buffering distance it will be just as acceptable as a less noisy source with very little distance between it and a person's ear.

The model by-law contains optional provisions governing transmission of noise in buildings. These provisions are based on Central Mortgage and Housing Corporation specifications, the Canada Building Code and the forthcoming Ontario Building Code. The provisions will cover new constructions, renovations and additions. The model by-law also provides for noise labelling of equipment purchased by municipalities.

The Ministry of Transportation and Communications is another provincial ministry concerned with noise problems, since it has jurisdiction over noise levels on the provincial highways which traverse Metro. The Ministry of Transportation has an environmental group to evaluate noise from new roads and this group is also taking measures to ameliorate noise problems on existing roadways. On new roads and for new buildings near provincial highways, measures are taken so that problems are avoided. New construction is subject to the approval of the provincial Ministry of Housing, and this Ministry routinely passes applications through the Ministry of Transportation and Communications for its comments. Once the effects of the new roads or existing roads on new construction have been evaluated, comments are passed back to the Ministry of Housing and if there are problems then modifications or changes in plans may be requested by the Ministry of Housing. In this manner, the Ministry of Transportation and Communications can influence the future planning of construction and of roadways so that noise problems are avoided in the future. The Ministry of Transportation and Communications also evaluates noise levels that will be produced by vehicles on provincial highways. It then translates these predicted noise levels into land buffer or building construction requirements. The resulting land use as specified by the Ministry of Transportation and Communications, may or may not be the same as the land use requirement of a municipality.

The Federal Government becomes involved in noise within Metro through its jurisdiction in the area of permissible vehicular noise from new vehicles, as covered under the present Motor Vehicle Safety Act. The federal Ministry of Transport is also responsible for noise control of railway operations. This jurisdiction is obtained through the Canada Railway Act. By contrast neither the provincial Ministry of the Environment nor the municipalities have any jurisdiction over railways in noise control matters. Any locally originating requests to control railway noise would have to be made to the Ministry of Transport at the federal level and to the Department of the Environment.

Similar jurisdictional problems are encountered with regulations pertaining to federal facilities

such as airports and noise from aircraft. The regional offices of the federal Department of the Environment has the responsibility for noise control on federal projects within their jurisdiction. On large new federal undertakings, be they federal projects or federally funded projects, the Federal Government makes its intentions known through announcements in the Canada Gazette and through public hearings. Briefs are requested and the public are thus provided an opportunity to express themselves on the problems of noise which they foresee as a consequence of a proposed project.

4. Inferences for Metro

While the regulation and control of noise lies nominally with the area municipalities, their actual jurisdiction is quite limited. The Metropolitan Government has remained clear of involvement with noise except for that originating on facilities under its direct ownership and control.

Major noise sources affecting Metro are the railways under jurisdiction of the Federal Government and airports and aircraft also under the jurisdiction of the Federal Government. Vehicle noise at source for new vehicles is also regulated by the Federal Government.

The provincial Ministry of the Environment would like to see a uniform approach to noise across the Province and certainly across Metro. From the Ministry's standpoint it would be desirable for Metro to have uniform noise criteria for similar types of land use; also having a single agency such as Metro to enforce noise control would be less costly in equipment and manpower. This approach may not, however, be acceptable to the individual municipalities.

It is not clear how the proposed model by-law would handle excessive existing noise levels that may be above those proposed by the standards contained in the by-law. A rollback procedure to reduce noise is not spelled out and it appears that this would be left to the municipalities.

At present, no mechanism exists by which a municipality can seek to enforce compliance with local noise regulations within the boundaries of its municipality, where the source is a federal facility or a facility subject to federal control. Protocol requires such representation to pass through the Province since the Federal Government does not formally deal directly with the municipalities. In cases where the source is a provincial facility or a facility subject to provincial control the municipality is able to make representation to both the specific ministry concerned and to the Ministry of the Environment.

5. CONCLUSION AND ISSUES

In the preceding pages, observations on the operation of major utility features serving the populace of Metropolitan Toronto have been made together with an analysis of the environmental problems relating to the control of air quality and noise levels.

In each of these study areas, a summary has made reference to areas of concern and conflict that relate directly to them and to which the Commission and the public may wish to give consideration.

It is important, however, to observe that in general servicing under the current mandate of the Municipality of Metropolitan Act has developed to a very high level with minimum conflict between the Metropolitan Corporation and its area municipalities. Either the terms of the current Act or the efforts of politicians and officials to make it work or both have successfully provided an atmosphere of cooperation and progress which has achieved a high level of service.

It appears questionable whether any of the current concerns in environmental quality or servicing could justify extensive changes to the Metropolitan Corporation's powers. Possibly some situations in the future now becoming more obvious might do so but the major concerns appear to relate to the complexity of constraints placed upon the Metropolitan Corporation by regulations of the provincial and federal governments.

In summary, the Commission may wish to consider certain issues as questions in its public hearings such as:

1. Does the complexity of the problem of urban runoff and its relation to watersheds extending between area municipalities and beyond the Metropolitan Corporation's current boundaries suggest the need for a more comprehensive management of storm water and drainage? Presumably the presence of the Metropolitan Toronto and Region Conservation Authority could be utilized to test alternative courses of action.

2. The disposal of refuse and residue materials is a Metropolitan responsibility in law and Metropolitan Toronto is provided with specific powers to deal with this situation. Does the eight-year history of this problem not suggest that external controls of senior government and public rejection of the concept of disposal of waste to the countryside or in any burning facility suggest that the Metropolitan Corporation cannot on its own cope with this problem?

3. There is obvious concern in matters of air quality preservation and emissions controls from all quarters and yet the approach to this problem is not sufficiently coordinated among federal, provincial and municipal jurisdiction to avoid confrontation and inequities from time to time.

4. Is it possible that a Metropolitan Energy Commission may provide a possible solution in which the operations of the six area electric utilities might be merged and in which the choice of energy use might be controlled to meet provincial regulation and Metropolitan planning concepts.

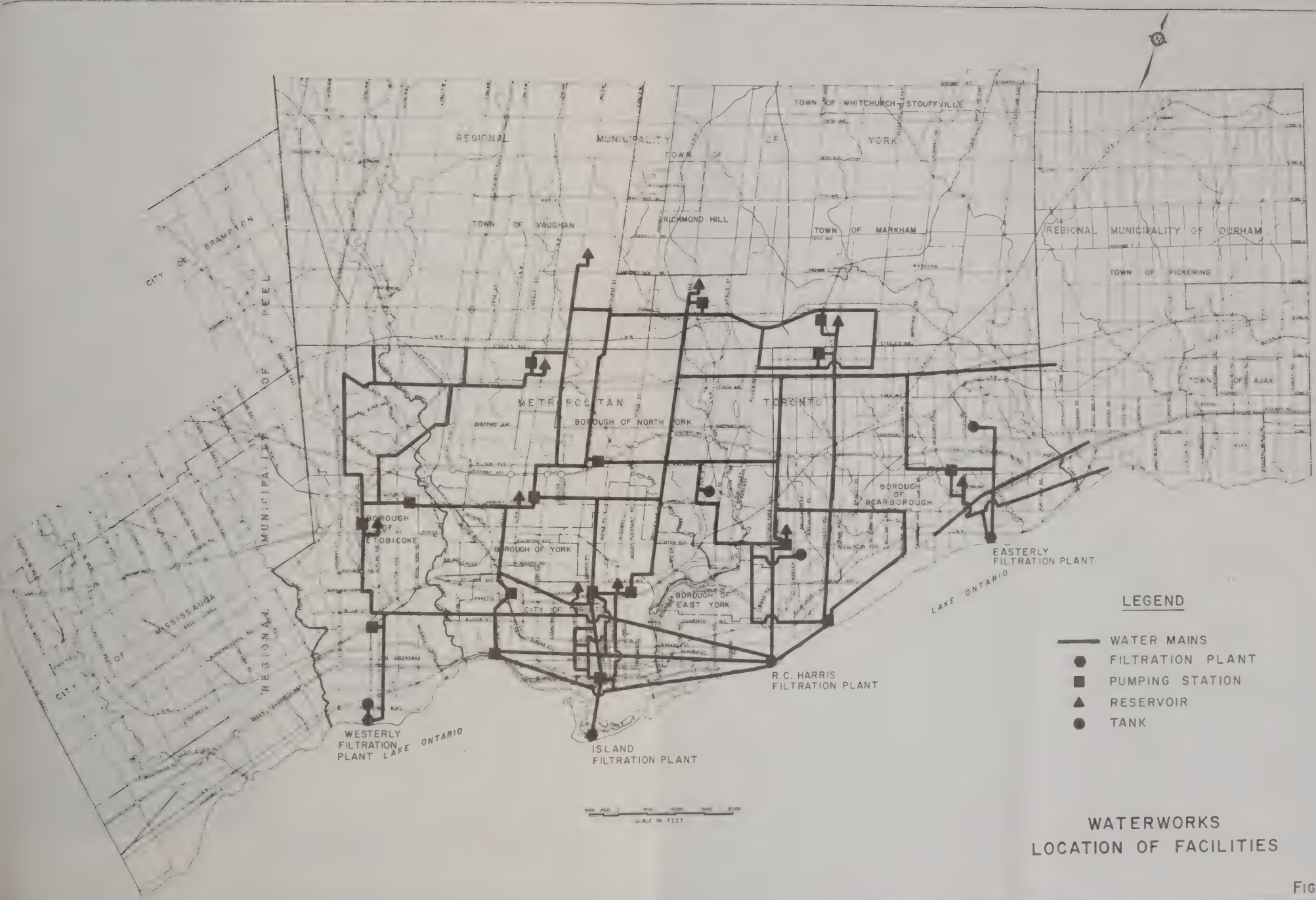
   Would such action be given greater emphasis if energy conservation and controls become mandatory to our way of life?

5. Noise to people is subjective and varies in its effect from person to person and area to area. Does this suggest the need for provincial regulation to be administered at a Metro or area municipality level or does it in the alternative suggest local control?

6. If considering the possible extension of the Metropolitan Corporation's jurisdiction and boundaries, serious consideration should be placed on its inability to expand its current capacity in sewerage and sewage treatment to serve increased areas and tributary flows except at substantial financial costs. Already with the spectre of tertiary wastewater treatment and storm water quality control, the Metropolitan Corporation has almost insurmountable financial obstacles in which it may ultimately require outside assistance.

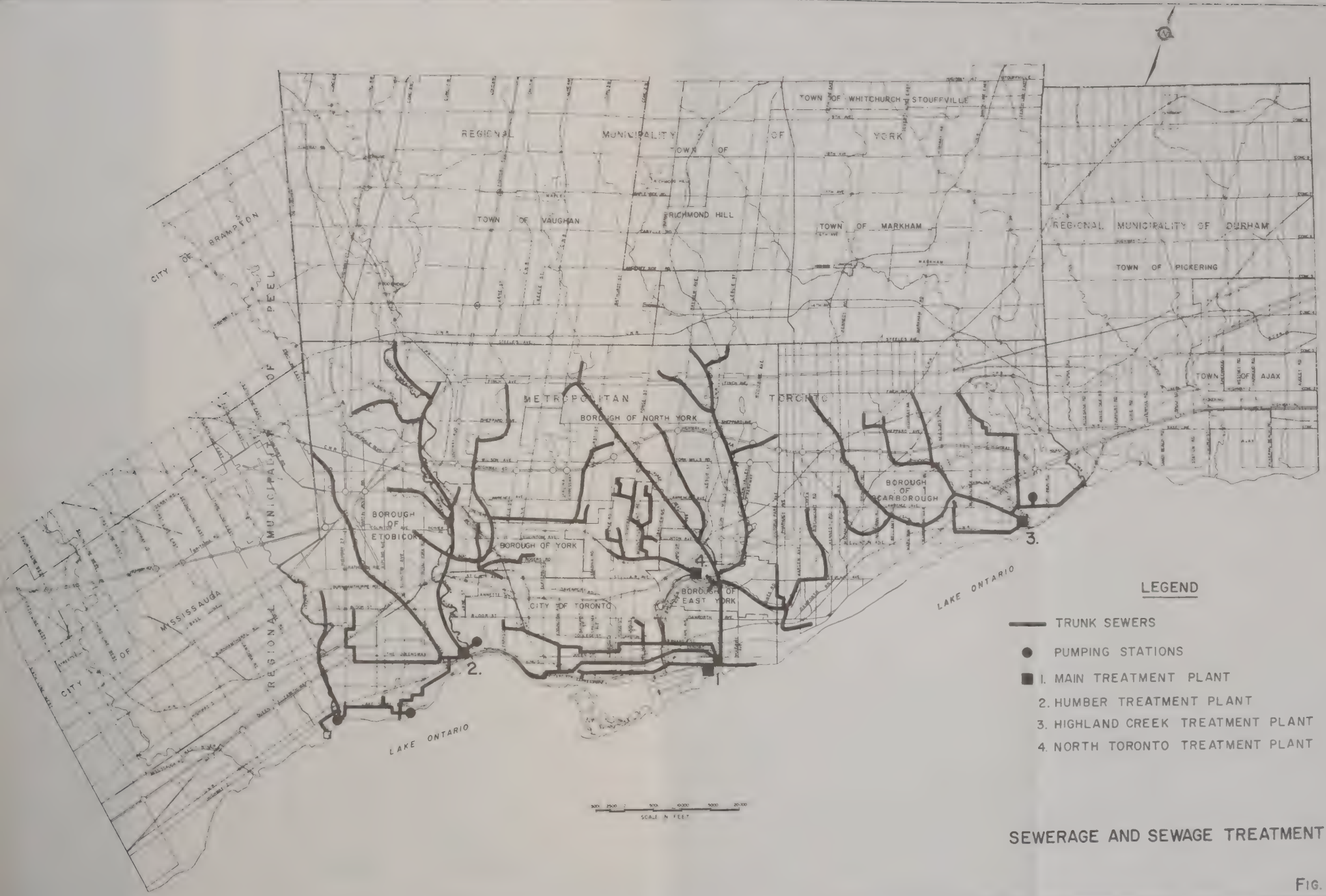
APPENDIX

LIST OF FIGURES



WATERWORKS
LOCATION OF FACILITIES

FIG. No. 1



SEWERAGE AND SEWAGE TREATMENT

FIG. No. 2

SOLID WASTES
LOCATION OF FACILITIES

FIG. No. 3

LEGEND

● LOCATIONS OF CONTINUOUS AIR QUALITY SAMPLING STATIONS IN METROPOLITAN TORONTO

AIR QUALITY SAMPLING LOCATIONS

FIG. No. 4

Background Studies Prepared for

THE ROYAL COMMISSION
ON METROPOLITAN TORONTO

- The Organization of Local Government in Metropolitan Toronto
- A Financial Profile of Metropolitan Toronto and its Constituent Municipalities, 1967 - 1973
- The Planning Process in Metropolitan Toronto
- The Electoral System for Metropolitan Toronto
- Demographic Trends in Metropolitan Toronto
- The Provision and Conservation of Housing in Metropolitan Toronto
- Transportation Organization in Metropolitan Toronto
- Physical Services, Environmental Protection and Energy Supply in Metropolitan Toronto
- Public Safety Services, in Metropolitan Toronto
- Social Policy in Metropolitan Toronto

Copies of any of the above reports may be obtained by writing:

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